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Water in Antiquity

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THE basic importance of food in the daily lives both of individuals and of communities, and the all-pervading influence upon outlook and social structure exercised by the methods adopted to ensure its adequate supply have become more and more widely recognized among students of ancient society during recent years (1). Rather less attention has yet been paid to water (2), that other necessity of life, bound up so intimately with the distribution and density of human settlement, and linked at the same time with man's exploitation of his physical environment. Yet water-supply merits the closest attention, not only of those who approach prehistory from a functionalist point of view, but of all those whose studies are in the last resort based on archaeological material. In the first place, the connexion between human settlement and sources of water offers a cardinal clue to the location of ancient sites; in the second, the dampness of wells and springs has made for conditions favourable to the preservation of objects, organic as well as inorganic, which in the course of time have found their way into their recesses; and in the third, the veneration in which sources have been held has fostered from time immemorial the deposition in their waters of offerings as welcome to the archaeologist as to the spirits themselves.

The relations between water-supply and human settlement through the ages have not by any means been simple; on the contrary, they have been essentially reciprocal, subject to perpetual readjustment in the course of time. If on the one hand settlement may be restricted by shortage, on the other human requirements may lead to an increase in the supply of water made available. Nature imposes certain limits, but within these there is scope for a wide range of adjustment. It must be obvious that in any local study consideration should first be given to the natural possibilities of the region, to the climate, the distribution and character of its natural sources and to the occurrence or otherwise of subsoil water. For present purposes I shall confine myself to a general

¹ The basic importance of food supply has been stressed by the present author in his *Archaeology and Society*, pp. 152-8, where references will be found to some of the most outstanding work in the archaeological reconstruction of ancient food supply. In the field of anthropology Audrey I. Richards' *Hunger and Work in a Savage Tribe* (1932) and her later monograph *Land, Labour and Diet in Northern Rhodesia* (1939) may be cited as illustrating the new trend.

² Reference should, however, be made to C. E. N. Bromehead's excellent paper, 'The Early History of Water-Supply', *Geog. J.*, 1942, xcix, 142-51, 183-96.

Basic sources of food	Settle- ment	Sources of water supply	Methods of lifting water	Utilization of water
Tractor agriculture	Decen- tralized urban	Artesian wells	Spontaneous (artesian) Power-driven pumps	Hydro-electric engineering
Plough agriculture Irrigation in arid zones	Urban	Lift wells	Hand pumps Wheels and belts Winches Shaduf or lever lifts	Mills and lathes turned by water- wheels Mined ores washed Town drains, baths
Hoe agriculture	Rural	Enclosed springs or 'tites'	Dippers, ladles, etc.	Alluvial ores washed Domestic industries— fulling, laundering, etc. Magical-medical uses
Food gathering	Seasonally nomadic	Natural springs or streams		Drinking, cooking

Table illustrating the development of facilities for the supply of water and its utilization.

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consideration of the manner in which men have sought to adjust the supply of water to their social needs under varying cultural conditions and within the limitations imposed by nature.

A primary factor in the evolution of artificial methods of water-supply has been a growth in the density of settlement, in itself a concomitant of cultural progress. Obviously men living under nomadic or semi-nomadic conditions would be free to wander from one natural source of water to another. Like the beasts and their water-holes, they would find these sources adequate to their needs without artificial improvement. Under such conditions live some of the simpler peoples of our own day; under such, we may be certain, lived our forbears of Palaeolithic and Mesolithic antiquity.

In temperate Europe, subjected to the complex and disturbing events of the Quaternary Ice Age, it is unlikely that we shall ever obtain much direct evidence about the actual settlements of Lower Palaeolithic man. In areas such as North Africa and contiguous parts of Asia, on the other hand, it is possible to study his habitat substantially unaltered, save for the effects of desiccation, whereby verdant parklands have been transformed into more or less arid wastes, lakes have dried up or contracted and springs failed. Here the quest for Palaeolithic man should centre first and foremost on the now extinct, but once vital, sources of his water supply. Most significant in this respect are the excavations carried out in the Kharga Oasis by Miss G. Caton-Thompson; by detecting and dissecting the fossil springs upon which the Acheulian men of the region depended, and extracting shapely 'hand-axes' from tufa bearing the imprints of the oak-leaf, she has in effect opened up a vast and fascinating field of research. As she herself wrote of her discovery:—

'... in the "fossil" spring deposits of Kharga Oasis we have a magnificent chance of resolving the stratigraphical succession of the Stone Age industries, which are represented both in the depression itself, and so prolifically upon the bounding scarp; and it seems not unlikely that the deposits themselves, with marked evidences of alternations of quiescence and great activity of water discharge, may provide us with an unexpected instrument of great value in palaeo-climatic enquiry' (3).

Not until Upper Palaeolithic and Mesolithic times does one meet in Europe with adequate evidence bearing on the siting of open dwelling-places. A fact which leaps first to the eye is that, whether one looks to the caves of the Dordogne or the Vézère or to the earth-houses of the Don or the Desna, we find Upper Palaeolithic man camping by river courses, in caves or shelters in the gorges through which their waters run, or in houses on their banks (4). The attraction of rivers is even more clearly seen when one considers Mesolithic Europe (5), although it must be remembered that rivers were sought for their fish as much as for their water. More decisive is the evidence of such springs as the Schüssenquelle, south of the Federsee in Württemberg, from the peats and tufas of which were excavated flints, bones and antlers worked by Upper Palaeolithic hunters (6), or the spring at Farnham, Surrey (7), round the head of which Mesolithic food-gatherers scooped out the floors of their winter dwellings, and to which repaired men of successive periods up to Roman times.

³ *Man*, 1931, no. 91.

⁴ *Proc. Prehist. Soc.*, 1939, v, 100-103.

⁵ J. G. D. Clark, *The Mesolithic Settlement of Northern Europe*, 1936, pp. 23-4, and *Proc. Prehist. Soc.*, 1937, III, 472-5.

⁶ R. R. Schmidt, *Die Diluviale Vorzeit Deutschlands*, 1912, fig. 12.

⁷ J. G. D. Clark and W. F. Rankine, 'Excavations at Farnham, Surrey', *Proc. Prehist. Soc.*, 1939, v, 61-118.

Throughout the ages, indeed, springs have remained foci of human settlement and as such sign-posts to the discerning archaeologist. More than that, they are capable of yielding invaluable evidence of natural conditions prevailing at different periods. Calcareous tufa such as is deposited in spring water is always worth attention, since it may not only disclose the former presence of a spring and consequently of human settlement, but may also yield impressions or actual remains of contemporary vegetation and animal life. As Hulth and Sernander were the first to show in Scandinavia (8), the mere fact of excessive tufa formation may, even in temperate countries, betoken periods of heavier rainfall and more active springs. Before valid conclusions can be drawn for a given area, however, it is necessary to assemble a substantial body of evidence in the form of archaeological finds in true stratigraphic relation to calcareous deposits, on the lines followed in the Swabian Alps and the Black Forest by Rieth (9). Work on the recent calcareous deposits of this country remains in its infancy, but has already confirmed the heavier rainfall of Atlantic times for which other evidence is available (10).

In proportion as man began to assume a greater measure of control over his physical environment, basing his subsistence to an ever-growing extent on food won by his productive labour, and bending to his own purposes the physical properties of an ever-widening range of material substances, so his outlook in relation to his water-supply shifted from acquiescence to purposeful mastery. The history of man's control over his supply of water is thus only one aspect of that of his general control over nature, although one with a special relevance to the problems of human settlement. Man has sought to control water primarily for domestic and agricultural needs, but increasingly also for mining and industrial purposes. The essence of this control has been to make water available at the time and place and of the quality and in the volume required. This has been achieved, broadly speaking, by lifting, conducting and storing water, or more often by a combination of two or all of these.

A common device for securing a ready supply of water from a natural spring breaking the surface of the ground was to reinforce the sides, either with stones or wood; by such means a sufficient depth of water was accumulated to make it easy to collect in buckets, dippers or other receptacles. The reinforcement of the sides of the spring also had the effect of keeping the water clean and preventing the silting up of the springhead. To denote such artificially improved springs C. E. N. Bromehead (11) has recently revived the old Cotswold term 'tite'. Enclosed springs or tites may be considered the first improvement on the natural spring and, as such, are of remote antiquity. Yet for the needs of small communities such economical adaptations must long have sufficed. Among the prehistoric peasant peoples of Europe tites were in general use for domestic purposes, nor have they passed out of memory even in the rural England of today. The Jutish farms of the pre-Roman Iron Age excavated by Hatt were furnished with stone-lined tites, comprising funnel or saucer-shaped holes at the bottom of shallow, oval or circular depressions, from which water was drawn directly, sometimes with the aid of a recumbent

⁸ J. M. Hulth, 'Über einige Kalktuffe aus Westgötland', *Bull. Geol. Inst. Univ.*, Upsala, IV, 1898.

⁹ A. Rieth, 'Vorgeschichtliche Funde aus dem Kalktuff der Schwäbischen Alb und des württembergischen Muschelkalkgebiets', *Mannus Z.*, 1938, pp. 562-84.

¹⁰ e.g. Flint and chert implements of Late Mesolithic appearance have been obtained from tufa deposits at Prestatyn, Flint, and at Blashenwell, Dorset, the mollusc assemblages from which have been diagnosed by Dr Wilfrid Jackson and Mr A. S. Kennard, respectively, as indicative of a rainfall higher than that prevailing today. See J. G. D. Clark, *Proc. Prehist. Soc.*, IV, 330-4; v, 201-2.

¹¹ op. cit. 142.

boulder stepping-stone or in the case of deeper ones by a stone step projecting from the sides (12).

An alternative method of reinforcing the sides of a natural spring by means of a short section of hollow tree-trunk was resorted to during the Bronze Age of northern and central Europe and can be observed in use down to the present day in backward parts of peasant Europe (13). In a simple form it is exemplified by the spring at Budsene on the Danish island of Moen, enclosed in a hollow alder trunk. The fact that this yielded women's ornaments of bronze, girdle-cases and armlets, in addition to a miscellaneous collection of animal bones, suggests that we have to do here with women's votive offerings to the spring's godhead (13a). Springs, indeed, have seldom been regarded merely as sources of water. Bubbling from the ground, ever renewed and ever pure, it is hardly surprising that springs should have impressed early man by their magical potency. That well-worship, or at least the association of divinities with wells, flourished in pre-historic Europe we can feel sure from the attitude of the early Church, which beginning by interdicts ended by adoption (13b); the saints 'wells' of Cornwall—actually all of them are enclosed springs, not wells (13c)—are but the Christianized versions of pagan godheads (13d). As more positive evidence one might cite the gold signet-ring from Mycenae, whereon was depicted the 'adoration of a sacred spring descending from a height within a walled temenos, and its source sheltered by three trees within a little enclosure' (13e), or Homer's reference to the Achaians offering hecatombs to the immortals 'round about a spring . . . beneath a fair plane-tree whence flowed bright water' (13f), in each of which there is associated an element of tree-worship, an association illustrated in our own folk-lore by the custom of pinning rags to trees and bushes close to springs. In his study of the holy 'wells' (*sic*) of England R. C. Hope has shown that divination of the future from the behaviour of bubbles rising from the casting of pins or coins, physical healing, especially for eye diseases, skin troubles, and the infirmities of old age, and the promotion of fruitfulness among women have all played their part, alongside with worship, in recent folk-lore. More elaborate, but of the same general class is the famous spring of St. Moritz (13g). Here, post-dating an earlier phase,

¹² e. g. G. Hatt, *Aarborger*, 1938, 161-5 and figs. 29-32; also 199-201 and figs. 73-5.

¹³ For example, one closely resembling that from Budsene is illustrated from modern Bulgaria by C. Wakarelski in his 'Brunnen und wasserleitungen in Bulgaria', *Folk-Liv*, 1939, taf. 2c.

^{13a} C. A. Nordman, *Aarbøger*, 1920, pp. 63 ff.; J. Brønsted, *Danmarks Oldtid*, II, p. 202, fig. 187.

^{13b} Well worship was interdicted by the Council of Tours A.D. 567, and prescribed by the laws and canons of kings Egbert, Edgar and Cnut, but the 26th canon of St. Anselm, 1102, merely enjoined that 'no one attribute reverence or sanctity to a dead body or a fountain, without the Bishop's authority'. R. C. Hope, *The Legendary Lore of the Holy Wells of England*, 1903, p. xx.

^{13c} Although sometimes enclosed by elaborate masonry, or even, as in the case of St. Madern's 'well', Madron, by a complete chapel, they remain tites from which water could be scooped directly.

^{13d} R. C. Hope, *op. cit.* pp. 112-15, suggests that the votive tablet inscribed to the goddess Coventina, which together with 24 altars and a number of vases, rings, beads, brooches and coins, was recovered from a well at Carrawburg on the Wall, were deposited by the guardians or priests of the well fleeing the Theodosian persecution.

^{13e} Sir A. Evans, *Palace of Minos*, III, 137-8. ^{13f} *Iliad*, II, 305-7.

^{13g} As evidence of the persistence of the custom of depositing coins, one may quote the instance of the children's spring at Tolgs skn., Norrvidinge hd., Småland, from which were recovered no less than 540 silver and 5394 copper coins, ranging in date from Magnus Eriksson, 1319-64, to Oscar II. *Vitt. Akad. Månadsblad*, 1903-5, pp. 3-8.

represented by a much decayed shaft, were found two larchwood shafts (one 1.83 m. high and 1.12 m. in diameter, the other 2.35 m. high and 0.78 to 1.07 m. in diameter) enclosed within a double rectangular enclosure of the same wood, the inner of plank, the outer of block-house construction. From the base of the shallower of the two shafts were recovered a series of bronzes, dated to the transition between Reinecke's c and d phases of the Bronze Age and comprising two bronze hilted swords, both sticking vertically into the bottom, a pin, a dagger with broken tang and the upper part of a sword blade, bronzes which can only be interpreted in such a context as votive offerings. In this particular case one may safely guess that the offerings were made in the hope of healing; situated some 1775 m. above sea-level in an Alpine valley, scanty in traces of early settlement, St. Moritz would appear already at this early date to have been a place of pilgrimage made famous by the healing virtues of its chalybeate springs (13h). Thus already in the Bronze Age there is evidence that the peoples of prehistoric Europe made substantial offerings to springs as sources of fertility and healing, offerings later commuted to coins and pins.

An obvious advance on the enclosed spring or tite was the well in the sense defined by C. E. N. Bromehead as a 'means of obtaining water from the earth vertically beneath the spot at which it is required, where it is not obviously present at the surface' (14). In the well, tapping subterranean supplies, we have a radically new departure, even if superficially, and from a formal standpoint it may not always be easy to draw a hard and fast distinction between a shallow well and a deep tite. Whereas a spring either breaks surface or at least betrays itself by such visible signs as the vapours, frogs, toads or damp-loving plants specified by Pliny and Vitruvius as propitious to the seeker after water, the sinking of a well involved a definite break with everyday experience, an incursion into the unknown and, until comparatively recently, the unpredictable (15). The sinking of wells was not only a new departure psychologically; it also involved heavy economic burdens. The well shaft itself had to be dug, boring, at first by hand augers and only since 1832 (16) by machine, being a relatively modern process. Then the shaft had to be lined or steined to retain the sides and exclude impurities. The greater depth of wells made it the more necessary to enclose their heads, if only to prevent children falling down the shafts. Moreover, once constructed, wells had to be maintained, for which purpose various forms of steps or foot-rests were commonly provided in the shaft. More burdensome still was the day to day operation of wells, involving in place of the facile scooping of water from the natural spring or homely tite, the labour of hauling the water up the shaft, a task which nevertheless was lightened by a variety of lifting appliances.

Sufficient has been said to make it evident that wells can hardly be regarded as a necessary or inevitable link in a chain of development from the flowing spring. On the contrary they represent a revolutionary innovation which can only have come about through the play of powerful social forces. The necessity for artificial sources of water supply was brought about by pressure of population, at once a cause, an index, and a consequence of man's increased control over nature. This growth of population resulted in an increased density of areas of primary settlement and in an expansion into poorer

^{13h} J. Heierli, 'Die bronzezeitliche Quelfassung von St. Moritz', *Anz. für Schweizerische Altertumskunde*, N.F. Bd. ix (1907), 4 Hft., pp. 265-78; M. M. Lienau, 'Die bronzezeitliche Quelfassung von St. Moritz', *Mannus* Z., 1908, x, 25-30.

¹⁴ op. cit. 142.

¹⁵ The first well sited on strictly scientific principles to reach water in agreement with anticipation appears to have been sunk in Derbyshire in 1795. C. E. N. Bromehead, op. cit. 149.

¹⁶ *ibid.* 151.

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regions previously neglected because deficient in natural supplies of water. With the rise of urban centres the natural sources of water locally available ceased to be adequate, on the one hand because deficient in volume and on the other because contaminated through long-maintained and over-dense settlement. Moreover city life meant not only that more people required water, but that more people required more water; the dirt and congestion of urban life meant that artificial facilities for bathing and washing and the provision of adequate sanitation became necessities of public health rather than luxuries. Small wonder is it that the provision of a pure and abundant supply of water has been a prime aim of city fathers since men first dwelt in cities. Thirst and pestilence between them were powerful stimuli.

Wells, tapping subterranean sources, were one of the obvious solutions to the problems of urban water supply, and occur throughout the ancient world in the zone of urban life. Within the wide range of geographical endowment and cultural differentiation prevailing there was ample scope for variety, both in construction and in the devices used for raising water. To turn first to construction, the simplest type of well was, obviously, that cut in rock sufficiently firm to require no artificial steining. Where the rock was suitable one might expect to find such 'primitive' wells at any period among peoples acquainted with the idea of well-sinking. Examples familiar to British archaeologists are those Roman wells sunk through the chalk of Cranborne Chase investigated by General Pitt-Rivers (17). Yet, in the ancient East and in the Mediterranean basin, where urban civilization first spread on the European mainland, we find, side by side with such simple wells, a wide range of others which appear, as it were, fully differentiated and sophisticated in construction, in the earliest contexts.

Thus, the wells of Mohenjo-Daro, among the very oldest in the world, had their circular shafts, ranging in diameter from two to seven feet, lined throughout with specially contrived wedge-shaped bricks. Low brick copings, surrounded by brick pavements worn with hollows where the water-jars once stood, finished off the well-head and served to keep it clean. Water-logging in the lowest levels prevented the excavators from ascertaining the total depth of the wells, many of which are known however to date from an early stage in the history of the city. Indications of additions to the brick linings given by clearly marked joints show that as the level of the city rose on its own rubble, so the steining of the wells had to be built up to keep their heads above ground. In such a manner did the pressure of social life, in the form of long continued settlement on the same site, increase the labours of the water-drawers. Today as the well-shafts stand clear of the excavated portions of the city mound, they resemble nothing more than grotesque factory chimneys (18).

An entirely distinct use of fired clay for lining well-shafts is that met with in the Eastern Mediterranean. Thus the well in the courtyard of the Mycenaean megaron palace of Phylakopi was lined by a succession of tubular sections of fired clay, each some 2 ft. $1\frac{1}{2}$ ins. to 2 ft. 3 ins. in diameter and 2 ft. $10\frac{1}{2}$ ins. in length and having one end flared for retaining the next in sequence. The shaft was excavated to a depth of 9 metres when the work was halted by water. Oval holes in the earthenware sections

¹⁷ General Pitt-Rivers excavated two wells in the Romano-British settlement at Woodcuts, Rushmore. Although the recovery of the metal handle and bands of a wooden bucket from the bottom of one of these (188 ft. deep) shows it once to have been in use, the well proved on excavation to be quite dry and remained so until refilled. In such a manner wells may sometimes give indication of a lowering of the local water table. *Excavations in Cranborne Chase*, 1887, I, 27-8, and pl. v.

¹⁸ E. Mackay, *The Indus Civilization*, 1935, pp. 49-52, 57-8.

gave foot-hold and hand-grip to anyone ascending or descending the shaft (19). Not dissimilar was the well excavated by Sir Arthur Evans in the town area northwest of the Palace of Cnossos, although in this case each section was built up of three parts. This Cretan well (10.4 m. deep and 69 cms. in diameter) was in use during the Roman period, but may be more ancient in origin (20).

Stone is another obvious material for steining wells and its use can be shown from early times. Particularly skilful was the work of the Etruscan well-builders, who contrived shafts of splayed or bell-shaped profile with constricted mouths (21). Easier to construct must have been the stone-lined wells of the Romans, built with an even batter from constricted base to open mouth. A detail of interest revealed during the excavation of such wells at the Saalburg were the timber footings designed to keep the well bases from being choked by silt (22).

In central and western Europe the Romans commonly used timber for steining wells. Generally this took the form of a square sectioned framework filled in by wooden planking. In the case of deep shafts, such as some of those on the Saalburg which reached up to 24 metres, the excavation seems to have been carried out in stages, the sides of the shaft being steined down to a safe depth, before resuming work at a lower level. As each successive stage was dug on a more restricted area, the profiles of such well-shafts were characteristically stepped at the lower levels (23). The upper portion of the well-shaft was commonly left unsteined, the sides being battered to give a funnel-shaped section. Where, as in Roman Silchester, the shafts were comparatively shallow, it commonly happened that the timber frame extended less than half way up (24). Occasionally, as at London (25) and Silchester (26), the base of the well-shaft was lined by a wooden tub from which the top and bottom had been removed. At Silchester, also, wattletwork, held in place by a ring of stakes, was used to stein the lower portion of an 18 ft. well-shaft (27). The Romans were evidently practised well-sinkers, and judging from the numbers found on some of their stations, were prodigal of new shafts. Thus at the Saalburg no less than 98 wells were found, of which no more than 3 appear to have been in use at any one time, implying the frequent sinking of new ones. Their wells were hand-dug, the well-sinker descending by a ladder (28) and presumably having his spoil lifted by the type of winch normally used to raise water.

In northwestern and central Europe true wells appear either as direct Roman innovations, or, in regions outside the limits of the empire, as the probable result of Roman influence. At least in such regions wells cannot be shown to have occurred before the spread of Roman domination over contiguous areas. Those that are known from the opening centuries of our era in barbarian Europe belong to one of two main types, one lined with planks set into a framework of vertical corner-posts, the other of morticed plank construction. A good example of the frame type is the wooden well at

¹⁹ C. C. Edgar, *Excavations at Phylakopi in Melos*, 1904, fig. 51.

²⁰ Sir A. Evans, *The Palace of Minos*, III, pp. 255-9 and figs. 175, 176.

²¹ O. Montelius, *La civilisation primitive en Italie*, 1895, pp. 495 ff. and pl. 108, nos. 1 and 2.

²² H. Jacobi, 'Be- und entwässerung unserer limes Kastelle', *William Dorpfeld Festschrift* (Berlin, 1933), pp. 49-70.

²³ *ibid.* abb. 6, no. 4.

²⁴ Thus two wells at Silchester, 27 ft. and 21 ft. deep were steined for 13 ft. and 7 ft. respectively. *Archaeologia*, LVII, 93-4.

²⁵ *Arch. j.* XIII, 274.

²⁶ *Arch.* LVIII, 415.

²⁷ *Arch.* LVII, 94.

²⁸ The remains of a ladder with fir uprights and oak rungs were found at the bottom of what appeared to be an unfinished well at Silchester. *Arch.* LVII, 244.

Stickenbüttel, near Cuxhaven, explored by Karl Waller (29). The shaft, which has a funnel-shaped upper portion, was sunk into a low ridge above marsh-level through sand and loam to fresh-water-bearing sand. Originally the well had been a rather shallower 'tite', a funnel-shaped hollow lined by turf sods, enclosed by a stone setting and approached by a sloping path with three oak sleepers acting as steps. The wooden shaft, which superseded this primitive tite, comprised four square uprights pointed at the base and grooved for the reception of the side planks, the edges of which were bevelled so as to allow a neater fit. The lowermost course of planking was mortised to the uprights and reinforced by vertical timbers retained on the inside by another course of horizontal planking. The top of the shaft was 2.3 m. below ground level and the base 5.8 m. According to the pottery the Stickenbüttel well, the earliest in north Germany, dates from the period between the 2nd century B.C. and the 1st century A.D. An example of a wooden well-lining composed entirely of mortised side planks is that at Domsław, nr. Breslau, described by J. Richter (30) and dated by Jacob Friesen to the 3rd-4th centuries A.D. (31). Sunk down to water-bearing sands, the shaft was 1.4 m. deep and set at the base of a funnel-shaped opening extending 1.65 m. below ground-level. Both the funnel itself and the timber shaft were coated and packed with blue-grey clay.

Having considered well-shafts, attention must next be directed to the lifting apparatus made necessary by their depth. In ancient times there were two types in general use, a lever apparatus adapted to relatively shallow wells and various forms of winding and drawing apparatus for deeper ones. The former consisted of a long beam oscillating at the apex of a forked upright on the see-saw principle, the receptacle for the water being attached by a rope or long pole to one end of the beam, the other end of which was weighted to secure a counterpoise and so ease the task of drawing water. Such a device, the *shaduf* of modern Egypt, is of remote antiquity. It made its appearance, along with a simple type of plough in the Egyptian Old Kingdom (32); it was known in ancient Babylonia (33); in China it came in during the Han period (34), and at the present day it is still used extensively in Egypt and North Africa (35), Asia Minor, India (36), Italy, Iberia, the Balkans (37), Germany, Sweden, Finland (38), Hungary (39), Poland, the East Baltic States and White Russia. In North Africa today the *shaduf* is used to some extent in connexion with irrigation and there is reason to think that this may indeed have been its primary use. A possible link between the ladle or scoop and the balanced lever apparatus may be seen in the pivoted ladle observed by Wakarelski in Bulgaria in present day use for scooping water from irrigation channels (40).

An alternative method of lifting water from wells, and one that, before more modern developments, was necessitated for deeper wells, was to raise it in a receptacle attached to a rope or chain, by a process of hauling, either directly by the hands or indirectly on some form of winch or spindle. Use of the simpler method of hand-haulage may be betrayed,

²⁹ Karl Waller, 'Der Stickenbüttler Brunnen', *P.Z.*, 1929, xx, pp. 250-65.

³⁰ J. Richter, 'Zur vorgeschichtlichen brunnenkunde', *M.A.G.W.*, 1923, LIII, pp. 49-68.

³¹ op. cit. p. 35.

³² For a representation in a tomb painting, see P. Leser, *Entstehung und verbreitung des Pfluges*, 1931, abb. 342. Wooden *shaduf* hooks were recovered by Petrie from graves 249 and 558 at Tarkhan, dating from the IInd and IIIrd dynasties; see *Tarkhan I and Memphis*, 1913, p. 25 and pl. x, np. 6.

³³ H. Prinz, *Weltwirtschaftliches Archiv*, 1916, bd. 8, p. 11.

³⁴ P. Leser, op. cit. abb. 343.

³⁵ *ibid.* p. 541.

³⁶ *ibid.* abb. 345.

³⁷ For an illustration of a modern Bulgarian example, see C. Wakarelski, op. cit. fig. 6.

³⁸ P. Leser, op. cit. abb. 344.

³⁹ ANTIQUITY, 1938, pl. iv, opp. p. 361.

⁴⁰ C. Wakarelski, op. cit.

as it was at Mohenjo-Daro, by grooving of the lips of wells or their copings. Positive evidence for the use of winding devices is not often forthcoming from ancient sites, which makes all the more interesting such finds as those made by Jacobi at the Saalburg. For shallow wells the Roman occupants of this frontier stronghold used iron hooks on poles (41), but from deeper ones they wound up their water buckets on hempen ropes, either on grooved wheels revolving on metal pins (42), the diameter of the wheel depending on the depth of the well, or on spindle-shaped rollers like that found at Herculaneum (43). As Wakarelski has pointed out (44), the length of time required to raise water from a deep well, even where some form of winch was available, would be such as to render desirable some form of protection from the weather. This accounts for the often elaborate roofs found over wells in many parts of Europe at the present day; no doubt excavation in the immediate neighbourhood of ancient well-heads would often reveal traces of similar structures (45). With the harnessing of animals to winches much of the drudgery of raising water from draw-wells was eliminated, although, as Wakarelski states, this appears to have been almost confined to the Mediterranean zone. The pump, by means of which water was pushed or sucked to the surface, was a device familiar to the Romans (45a), and, mechanically operated, still plays a role superseded only in part by the spontaneous uprush of water from modern artesian wells.

An obvious alternative to tapping subterranean sources was to conduct supplies from a distance to the spot required. To a limited extent this could be effected by the actual carriage of water in skins or jars, but such was normally limited to the local distribution of water from spring or well-head. Travellers crossing arid zones might carry water between water-holes, and men defending a waterless eyrie might make hazardous descents and carry water back to the garrison (46), but in so doing they would be reacting to exceptional circumstances; under the conditions of normal and rational existence men have availed themselves, when they wished to convey water, of its fluidity and its capacity, given a sufficient overall drop, to surmount obstacles between source and place of use. For example, the ancient Minoans conducted water from the limestone spring of Mavrokolybo to the Palace of Knossos by means of a descending and ascending conduit (47), implying a practical knowledge of the fact that water finds its own level. It is of course on this principle that the modern use of water-towers for the distribution of water is based. As Bromehead has pointed out, much experience in the conducting of water must have been gained in the course of irrigation (48). The idea of extending the area of fertility by cutting irrigation channels, when applied to the problem of increasing domestic water supply, took the form of constructing artificial conduits or canals. In the forested regions of northwestern, northern and central Europe such are still made of wood, open

⁴¹ H. Jacobi, op. cit. abb. 6, no. 15. ⁴² *ibid.* ⁴³ *ibid.* abb. 7, no. 3.

⁴⁴ Simple draw wells in northeast Bulgaria and the Dobrudja observed by C. Wakarelski were sometimes as much as 100 m. deep.

⁴⁵ *Lothr. Jahrb.* 1910, XXII, p. 509, pl. 41.

^{45a} O. Paret, *Die Römer in Württemberg*, III, s. 101 and abb. 65, illustrates a reconstruction of a Roman well-house.

⁴⁶ The question of the supply of water in the hill-forts of southern England has frequently been discussed. In war men are willing to act—may be compelled to act—in a manner that normally would appear irrational. Under the conditions of primitive tribal warfare, a hill-top garrison would find little difficulty in fetching sufficient water from the valley, although dependence on an external source of water-supply must have placed barbarians at a fatal disadvantage when opposed by a civilized foe.

⁴⁷ *Palace of Minos*, II, pp. 462-3. ⁴⁸ op. cit. 183.

channels cut from solid split timbers or built up from boards, or whole trunks hollowed to the shape of tubular pipes. Timber pipes, often with iron hoops at their joints, were used for distributing water in the cities of northwestern Europe until recent times, while open canals of wood boards can still be seen from the roadside or the train window in use for canalizing drainage down steep slopes in areas of heavy rainfall and poor land-drainage. Similar open channels made of terracotta were used by the Mycenaeans for drainage purposes, having been found at Tiryns and at Phylakopi (49). Closed water pipes of terracotta were also in early use in the Mediterranean area. From Minoan Crete we find a refinement in the tapered pipes, designed to impart a shooting motion to the flow of water and so prevent an accumulation of silt, excavated by Sir Arthur Evans (50). The Romans, master plumbers of antiquity, conducted water in pipes and open canals of terracotta, stone, wood and lead (51). Such forms of artificial channel were used not only to collect and distribute domestic water supplies, but also for irrigating gardens, for drainage and for many other purposes. In their monumental aqueducts, designed to carry fresh water to the inhabitants of great urban centres, the Romans carried the supply of water for domestic use to a level only surpassed in recent times.

The modern method of supplying great centres of population from a distance involves the use of reservoirs to make the flow of water independent of seasonal change. The storage of water in tanks and cisterns has of course played a part in the history of water supply from early days. Water accumulated in this way might issue from springs, like that from the Perseia spring near Mycenae carried by the Mycenaeans in stone conduits and stored in long narrow stone cisterns (52). More often it was rainwater collected from the roof, or even, as at Cnossos, from flights of steps (53). In areas of low rainfall rainwater collected in this way formed an important source of supply. In modern Melos, for example, rainwater, collected on flat roofs sloping slightly to one corner and conducted by pipes to tanks below ground level, is made to last some households the whole year round (54). As will be shown later, the peculiar properties of rainwater made it of special value for industrial purposes, even where other sources were available for domestic requirements. Thus it may be that the Mycenaeans, who stored spring water in stone cisterns, used the large lead containers found on their sites for storing rainwater (55).

In northern and central Europe a number of wood-lined shafts have been discovered, which may, as Jacob Friesen has argued (56), have served in most instances as water cisterns rather than as wells; where, indeed, the shafts are sunk into impermeable clay their interpretation as wells is one that will not bear examination. Jacob Friesen regards them specifically as rainwater cisterns, although in no case, it must be confessed, have

⁴⁹ *Tiryns*, fig. 118; *Phylakopi*, fig. 57.

⁵⁰ *Palace of Minos*, III, fig. 173. ⁵¹ H. Jacobi, op. cit. abb. 8.

⁵² H. Schliemann, *Mycenae and Tiryns*, 1878, p. 141.

⁵³ Sir Arthur Evans has described (*Palace of Minos*, III, 236-51 and fig. 169 c) the ingenious methods employed to carry the rainwater round the angles formed by successive flights of steps and the devices for catching sediment.

⁵⁴ A picturesque detail mentioned by C. C. Edgar, op. cit. 49, is that it is usual to let the first rainfall of the season escape, since the roof is generally fairly dirty from the family having slept there during the summer months.

⁵⁵ Thus six circular lead containers with bronze edgings were found in the Shaft Graves at Mycenae G. [Karo, *Die Schachtgräber von Mykenai*, Munich, 1930, pp. 160 and 231], while Wace found a mass of moulten lead in burnt houses at Mycenae.

⁵⁶ K. H. Jacob-Friesen, 'Die Ausgrabung einer urgeschichtlichen Zisterne bei Algermissen, Kr. Hildesheim', *Nachricht. für Niedersachsens Vorgeschichte*, 1925, N.F., No. 2, 35.

traces of dwellings been found in proximity, a fact quite probably due to lack of adequate examination. Structurally these well-like wooden cisterns resemble closely the wooden shaft at Stickenbüttel. Thus the cistern found during the construction of the Mittelland canal near Algermissen, near Hildesheim (57), and dated to the beginning of our era had squared oak uprights mortised at the base to a rectangular framework and grooved to retain the side planking. The shaft was sunk into a blue clay, deficient in ground water, but admirably adapted for holding it. The cistern itself was some $3\frac{1}{2}$ m. deep and the head of the timber lining was approximately 4 m. below ground level. Rectangular sockets for steps were found in some of the side planks. Closely similar was the so-called 'well' at Gamla Uppsala described by Olsson (58), distinguished only by its slightly ruder construction, the corner uprights, ladder rungs and side-planks, being left untrimmed and the uprights, pointed at the base, being rammed directly into the subsoil. The Romans frequently built wood-lined cisterns in their frontier posts along the *limes*, which, since they were adequately provided with well-water for drinking, were almost certainly for storing rainwater for industrial purposes. As Jacobi has pointed out (59), the ancients esteemed rainwater for certain purposes owing to its softness and its freedom from the salts commonly dissolved out of the rock through which well water passes. Rainwater would be especially useful for dyeing, fulling, the washing of linen (60) and the preparation of flax (61). There is evidence that rainwater was collected, presumably for home industries, as early as Hallstatt times in Germany (62).

As has been shown, elaborate methods of assuring supplies of drinking water and facilities for washing and for the disposal of sewage and drainage appear as functions of city life. Like wells and aqueducts, drains appear at a high stage of development among the earliest urban communities. Thus the people of the Indus Valley, to whose wells I have already alluded, devised the most complete, as it is among the most ancient, system of drainage yet discovered. House drains of brick cemented with mud or gypsum mortar, or clay pipes, were connected with brick-lined street drains by which refuse was carried out of the city. Both house and street drains were provided with sumps from which solid matter could be collected. As the city grew on its accumulated rubble the drainage channels had frequently to be deepened and eventually replaced. Moreover, to cope with the Indus floods great corbelled culverts had to be built on the outskirts (63). The first people on the European mainland to sink wells, the Mycenaeans, were also the earliest to devise elaborate systems of drainage. Thus at Tiryns Schliemann found that the courtyards of the megara were so tilted that rainwater drained naturally into the mouths of shafts by which it was conducted to horizontal drainage channels below ground-level (64). At Phylakopi drains built of stone flags and rough stone blocks

⁵⁷ *ibid.* 29-36.

⁵⁸ M. Olsson, 'En forntida brunn vid Gamla Uppsala', *Upplands Fornminnesförenings Tidskr.* XXVIII.

⁵⁹ *op. cit.* p. 60. On the Saalburg the larger cisterns were shallow, oblong structures, 8 by 9 metres in plan and 1 metre deep.

⁶⁰ Sir A. Evans, *Palace of Minos*, III, p. 243.

⁶¹ e.g. flax is retted by seeping in soft water.

⁶² Thus a clay cistern, presumably for storing rainwater, was found immediately outside the outer wall of the living-room of one of the rectangular wooden houses of the Hallstatt stronghold of Neuhäusel, Westerwald. F. Behn, *Kulturgesch. Wegweiser Röm.-Germ. Central Mus. Nr. 2 Das Haus in Vorrömischer Zeit*, p. 23.

⁶³ For a concise description, see Mackay, *op. cit.* pp. 42-9.

⁶⁴ H. Schliemann, *op. cit.* pp. 204, 238 and 245.

were found immediately below the surface of many of the streets, the main line of drainage being such as to give a sufficient fall (65). The Mycenaean inhabitants of Phylakopi built stone sinks in the walls of their houses (66), the outlets of which issued into the street drains. The ordinary type of domestic bath used in Greece and the Aegean during the Mycenaean period was a splayed open pottery bowl about 40 inches in diameter having paintings of spirals and other designs on the inside. A complete pottery bath of this kind found during the excavation of the Mycenaean city at Phylakopi was bedded on a slab of ironstone placed in the corner of a room (67). Many years earlier the great Schliemann had found a fragment of such a bath at Tiryns (68). Doubtless, also, it was to such that Homer referred when he spoke of men being washed by female attendants in 'polished baths' (69); on a terracotta of early, but unknown, date from Cyprus we can see a bather squatting on his heels with water being poured over him by a woman (70). For bathing of a formal or ritual character the Mycenaeans had stone floored bathrooms with outfalls into the street drains and small plaster-receptacles set into the wall which may once have held oil or unguents. Such a bathroom was explored by Schliemann close by the larger of the two megara at Tiryns (71). From time immemorial women have sought water to wash their laundry, but only in the most advanced societies has this need been met by elaborate artificial means. As a rule textiles would be carried to the riverside and washed on the spot, though where the source of supply was spring-water it might be necessary to provide troughs, like the 'fair troughs of stone, where wives and daughters of the men of Troy were wont to wash bright raiment' in the waters of the twin fountains which fed 'deep-eddying Skamandros' (72).

There seems little doubt that the origins of artificial supplies of water for domestic purposes are closely bound up with irrigation. The idea of intensifying and at the same time extending human settlement by supplementing the supplies of water naturally available is not only analogous with that of extending the area of cultivation and increasing the yield of the land, but is to a large extent its logical outcome. Historically it was precisely in those great river valleys of the Old World where irrigation was first practised that urban civilization first developed, and as we have seen it was pressure of urban conditions which stimulated the development of artificial means of water-supply. While, as I have stressed, deep wells were born of the necessities of city life, methods of conducting water from distant sources and of lifting it from shallow wells on the lever principle seem to have been derived from experience gained in the manipulation and control of water during irrigation. It was in connexion with irrigation also that the water-wheel first came into use, as a lifting device. The spread of rotary devices for lifting water in the Balkans during recent centuries, wheels with scoops attached to their circumference or drums revolving belts with scoops, has recently been discussed by Wakarelski, to whom the reader is referred for illustrations. The origin of such is to be found in the ancient centres of civilization where irrigation was practised; endless chains of pots were used to water the hanging gardens of Babylon (73) and similar devices were referred to in Egyptian papyri of the 2nd century B.C. (74). To this day water is lifted from the deeper wells of Algeria by an endless chain of buckets revolving on geared wheels.

⁶⁵ C. C. Edgar, op. cit. p. 50 and fig. 36.

⁶⁶ C. C. Edgar, op. cit. fig. 44.

⁶⁷ C. C. Edgar, op. cit. pp. 13, 14 and 139 ff.

⁶⁸ H. Schliemann, op. cit. pl. xxiv, d, e.

⁶⁹ *Odyssey*, iv, 49-50.

⁷⁰ *Bull. de corresp. Hell.* 1900, p. 515.

⁷¹ op. cit. fig. 117.

⁷² *Iliad*, xxii, 154-7.

⁷³ *Ecclesiastes*, chap. xii.

⁷⁴ According to V. G. Childe, *What Happened in History*, 1942, p. 224.

The rotary method of lifting water was early applied to the problem of draining mine-workings. In particular the screw-pump or water-screw, originally devised by Archimedes of Syracuse (287-212 B.C.) for raising Nile water for irrigation works, was widely used in the Roman mines of Spain and south France. Consisting of a wooden cylinder with a helical copper vane or screw on a wood core, the Archimedean screw rotated by men working a treadmill was capable of lifting water approximately five feet. Arranged in a series at successive levels, it was possible to raise water a considerable height, though at ever-increasing cost in man-power (75). Many well-preserved examples have been recovered from Roman mines and their mode of operation is illustrated by models and wall-paintings (76).

The use of the water-wheel for lifting water must have suggested a ready means of utilizing its inherent power, a development pregnant with possibilities for lightening the burden of human labour. The power of flowing water was early applied to the recovery of two of the most precious metals of antiquity, gold and tin. Alluvial gold dust, first seen sparkling in the water of a stream, was most easily separated in a wood trough or dish, shaken in flowing water which carried off the lighter sand. Mined gold could be separated from worthless dust by spreading the pulverized ore on an inclined board and pouring on water in the manner described by Diodorus Siculus (77). A further step was to conduct water where it was required to utilize its scour; thus, Strabo wrote of the Iberian gold-washers that 'they flood the waterless districts by conducting water thither, and thus they make the gold dust glitter' (78). Here we seem to have a further application of methods of conducting water originally gained through irrigation. Indeed, the activities of gold-seekers seem on occasion to have brought them directly into competition with cultivators; when the Salassi, who dwelt among the foothills between the Po and the Alps, deviated the waters of the Durias river to wash mined gold they came into conflict with 'the people who farmed the plains below them, because their country was deprived of irrigation' (79). Again, in early times and throughout most of the Middle Ages the tinners of Cornwall used to recover the heavier ore by shovelling some of the tin 'bed' into an inclining wooden waterway or 'tye' and then by vigorous stirring help the flowing water eliminate the lighter waste.

But it was through the utilization of the force of flowing water by means of the wheel that water-power was to make its greatest, albeit retarded, contribution. In early times the most important application of the power generated by wheels turned by flowing water was to milling corn. The water-mill not only superseded the tedium of hand-querns, but transformed milling from a domestic occupation to a trade. The earliest references to rotary mills driven by water-power date from the 1st century B.C., but the invention seems to have made slow headway in the Classical World owing no doubt to the cheapness of slave labour. Not until the 4th century A.D. do references, among them the well-known one of Vitruvius, become common. A mill resembling that described by Vitruvius, with the difference that it was overshot instead of undershot (80),

⁷⁵ See T. A. Rickard, *Man and Metals*, pp. 421-4 and fig. 49.

⁷⁶ See a terracotta from Alexandria of Ptolemaic date (B.M. no. 37563); also a wall painting at Pompeii (*Illustrated London News*, 17 December 1927).

⁷⁷ See T. A. Rickard, *op. cit.* pp. 209-12. Diodorus was quoting from Agatharchides of Ciredus who visited the Egyptian gold mines in 170 B.C.

⁷⁸ Strabo, Loeb transl. 3. 2. 8.

⁷⁹ Strabo, Loeb transl., 4. 6. 7.

⁸⁰ In an overshot mill the water is canalized and its force increased. According to G. Brett, 'Byzantine Water-Mills', *ANTIQUITY*, 1939, pp. 354-6, the overshot mill may be a development of the Late Empire.

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was excavated by the Americans in the Agora at Athens, being dated to the time of Leo I (A.D. 457-474) (81). From earlier in the same century, also, we have what according to G. Brett (82) is the only representation of a water-wheel in Roman art on the recently uncovered mosaic in the Great Palace of Byzantium. It seems likely that Brett is correct in his view that the overshot mill may be a development of the Late Empire. On the feudal estates which followed the break-up of the Empire water-mills underwent a rapid development, a consequence in part no doubt of the disintegration of slavery, and the miller emerged as one of the leading figures of medieval society. Already by Domesday there were more than 5000 mills in England (83). There is evidence, also, in the pot-stone industry of the Alps that as early as the 1st century A.D. the Romans had harnessed mountain torrents to turn lathes (84).

It is only in our own day that the possibilities of water-power have been fully realized. Up to the present the prodigious power unloosed by hydro-electric engineers has been largely wasted in warfare, and the plants and dams, when not geared to the production of weapons of war, have themselves been destroyed by air attack or demolished in the wake of retreating armies. Directed into constructive channels the electrical energy generated by water-power is capable not only of ameliorating conditions of work, by banishing smoke and fumes, but of positively transforming society. By increasing leisure and doing away with the necessity of concentrating industry and population in the immediate neighbourhood of the sources of power, hydro-electrical engineering may yet go far to redress some of the worst evils of the Industrial Revolution, restoring the balance between town and country. Moreover the very scale of the projects involved in the harnessing of water-power to the production of electrical energy inevitably favours collective as opposed to individual enterprise. So, from the Stone Age to the 20th century has water reflected the image of society; first the food-gathering tribes camping round their springs; then the lowly peasants with their village tites; next the town-dweller and his aqueducts and wells with their diverse appliances and his water-driven mills and lathes; and finally the men of the future, breaking loose from the city bounds, banishing smoke and fumes and winning leisure for themselves and the control of energy for society at large.

⁸¹ A. W. Parsons, 'A Roman water-mill in the Athenian Agora', *Hesperia*, v, 70 ff.

⁸² Illustrated by G. Brett, *op. cit.*

⁸³ See *ANTIQUITY*, 1939, XIII, 266.

⁸⁴ For details of the industry, which survived in remote valleys up to the present day, reference should be made to Rüttimeyer's *Ur-ethnologie der Schweiz*, pp. 94 ff. In the modern survivals the water was canalized in open wooden leads with a sudden drop close to the wheel, the axle of which was used to turn the pot. The industry was mentioned by Pliny in his *Nat. Hist.* XXXVI, cap. 22.

The Travels of the Celtic Saints

by E. G. BOWEN

THE great developments that have taken place in the study of prehistoric archaeology during the present century have made it possible to outline with reasonable accuracy the major cultural movements associated with Western Europe for at least two and a half millennia before Christ. It is, therefore, fitting that some attempt be made to re-examine the cultural material of the proto-historic period in the West in the light of this vastly extended knowledge of prehistoric times.

One of the most clearly demonstrated features of the prehistory of the western seaboard of the continent is the abundant archaeological evidence that exists for the intense maritime activity that drew the peninsulas of Iberia, Brittany, Cornwall, Ireland, Wales and Scotland into close cultural contact with one another. The earliest, and possibly the most clearly demonstrated case of cultural unity among the islands and peninsulas of the Atlantic seaboard occurred in the last half of the third, and in the first half of the second millennium B.C., when the funerary ritual of the megalith builders spread from Spain to Brittany and thence to western Britain and Ireland, and by way of the Orkney and Shetland Islands to Scandinavia. There were, of course, vicissitudes in the history of the western sea-routes and, consequently, in the cultural activity of the islands and peninsulas associated with them, but, nevertheless, a cultural unity similar to that manifest in megalithic times is frequently observed as, for example, in the immediately pre-Christian centuries when Celtic-speaking peoples of the Early Iron Age moved from western France to establish their hill-forts in southwestern England, Wales, Ireland and Scotland. In the post-Roman centuries, the same territories became united once more; this time it was under the cultural stimulus of Celtic Christianity, and the Age of the Saints was inaugurated in the West. It is this Celtic Christian activity that really rivals in significance that of the megalith builders. It is, therefore, not inappropriate to attempt a comparative study of these civilizations with the special object of seeking to demarcate the major cultural provinces of megalithic times, and of observing the extent to which the ancient cultural associations between different territories survive (or are reproduced) in 'the spheres of influence', or the 'missionary fields' of important Celtic saints and their immediate followers. No archaeologist, anthropologist or prehistorian would be in any way surprised if such a continuity were shown to exist.

A number of initial difficulties are at once apparent. There is, unfortunately, no complete agreement between archaeologists as to the origin and diffusion of the various types of megalithic structures. This, naturally, limits the chance of settling upon any agreed cultural provinces in megalithic times, and all that is possible in this paper is to weigh the evidence from all sources and arrive at a number of tentative conclusions.

More serious problems are involved in any attempt to demarcate the 'spheres of influence' of individual Celtic saints. It is true that we have a vast quantity of literary material known as the *Lives of the Saints*, but with very few exceptions these *Lives* were written many hundreds of years after the saint is supposed to have lived, and although possibly representing ancient traditions, they are much influenced by medieval monkish imaginations and by deliberate Norman reorientation of their theme. The

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most satisfactory approach from the point of view of this discussion is to ignore the bulk of this material and turn to the well-known fact that in the Celtic Church a particular church usually owed its actual foundation to the saint whose name it still bears, or sometimes it might have been founded by an intimate disciple of that saint. If, therefore, the sites of all the churches and chapels dedicated to a particular saint, and all parishes bearing his name are mapped (after every effort has been made to verify the antiquity of the name applied to each site), we have a fair picture of the area over which his influence, possibly together with that of his immediate followers, spread. The distribution of a saint's cult can in this way be obtained independently of the unsatisfactory literary material available concerning his movements. The method, however, is open to criticism in so far as it is only rarely possible to verify the antiquity of a place-name or a church dedication in records that reach further back than the close of the Middle Ages; it is not possible therefore, to distinguish dedications belonging to the sixth and seventh centuries from those originating in a possible revival of the saint's cult in the eleventh or twelfth century. If such revivals were extensive they would falsify any inference drawn from the maps regarding the Age of the Saints. It is, therefore, worth while attempting to estimate the extent to which churches dedicated to a Celtic saint were established in medieval times. It cannot be doubted that there are several instances of the revival of a saint's cult for partisan purposes, as witnessed by the numerous *Lives* of the saints compiled during the Middle Ages. There was a revival of interest in the twelfth century in the great Scottish pioneer St. Ninian and several churches bearing his name were built at this time. Likewise, in the same century, there was a great revival of the cult of St. Teilo in Wales when strenuous efforts were made (as is shown by the Book of Llandâv) to appropriate all Teilo churches by imaginary title deeds to the see of Llandaff, although many of them were obviously located in the territory of St. David's. The usually accepted view of this controversy (with its attendant revival of interest in Teilo and his contemporaries) is that the author of the Book of Llandâv was on fairly safe ground in claiming that all the Teilo churches listed by him were (in virtue of their dedications) actual Teilo foundations, but that it was manifestly absurd to attempt to show that they must, therefore, belong to the newly created Norman see of Llandaff just because the church which had now become the cathedral was also dedicated to Teilo and because that saint had been elevated to the rank of an archbishop in the imagination of the Norman monks. This is all that the Teilo revival really amounted to—we have no evidence of any new Teilo churches being established at this time. Moreover, the technique of the Normans did not envisage such a scheme. Their normal procedure was to follow the military conquest of a territory by setting up a temporary castle, which if it managed to maintain itself was followed by a more permanent structure around which an alien township clustered. The church of this community was invariably dedicated to some Biblical saint. In the surrounding countryside the Norman monks appear to have employed themselves in writing up the *Life* of the most important local saint (as determined by native dedications already in being) purporting to show, among other things, that the saint in question had during his lifetime either visited Rome or recognized the overlordship of the Pontiff or that of Canterbury. Indeed, it has been suggested recently by Dr Robin Flower of the British Museum that the order in which the several *Lives* of the saints appear in the important twelfth century manuscript Vespasian A xiv, bears a close relationship to the progress of Norman-French control in South Wales during the period in which the manuscript was being compiled. All this suggests that Celtic dedications were possibly 'revived' but hardly extended beyond the limits of their original territories.

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Finally, in attempting to assess the extent of the revival of interest in the Celtic saints during the early Middle Ages it must not be forgotten that great pilgrim movements using the western seaways were a feature of this age (1). Welsh, Scottish, Irish and Breton pilgrims journeyed to the shrine of St. James at Compostella in northwest Spain and it is impossible not to see in these movements a continuation of interest in what happened in these territories in the early Christian period, as well as a broad continuity of local tradition reaching back to the days of the megalith builders. Thus, if there was a revival of interest in some of the Celtic saints during the early Middle Ages accompanied by further dedications, then it is likely that these new churches would have been established in very much the same areas as those in which the saint had originally laboured. A revival of a saint's cult may, therefore, be either a revival organized by the Normans for partisan purposes, resting nevertheless, on local tradition; or, it may arise from the direct survival of Celtic Christian traditions, in which case the activities of the original Celtic saints and of the subsequent medieval pilgrims may both be considered as echoes of still more ancient movements along these western sea-routes and so form part for our purpose of one and the same story.

The megalithic tombs of northern and western Europe have been classified broadly into passage-graves and gallery-graves. Some archaeologists (2) have seen in this classification two distinct cultural movements, one diffusing passage-graves and the other gallery-graves. Other workers (3) deny that there are two streams at all. They maintain that gallery-graves are linked together only by their ultimate derivation from the passage-grave and similarities between one area and another are due to parallel degeneration. In the present study neither the origin of the major diffusions involved, nor the immediate antecedents of the various types of monument encountered in the different areas can be considered as matters of primary importance—the aim is to classify monuments irrespective of origin, and to single out areas where special types are dominant. For this purpose the general designation passage-grave and gallery-grave may be used without prejudice as to their typological associations.

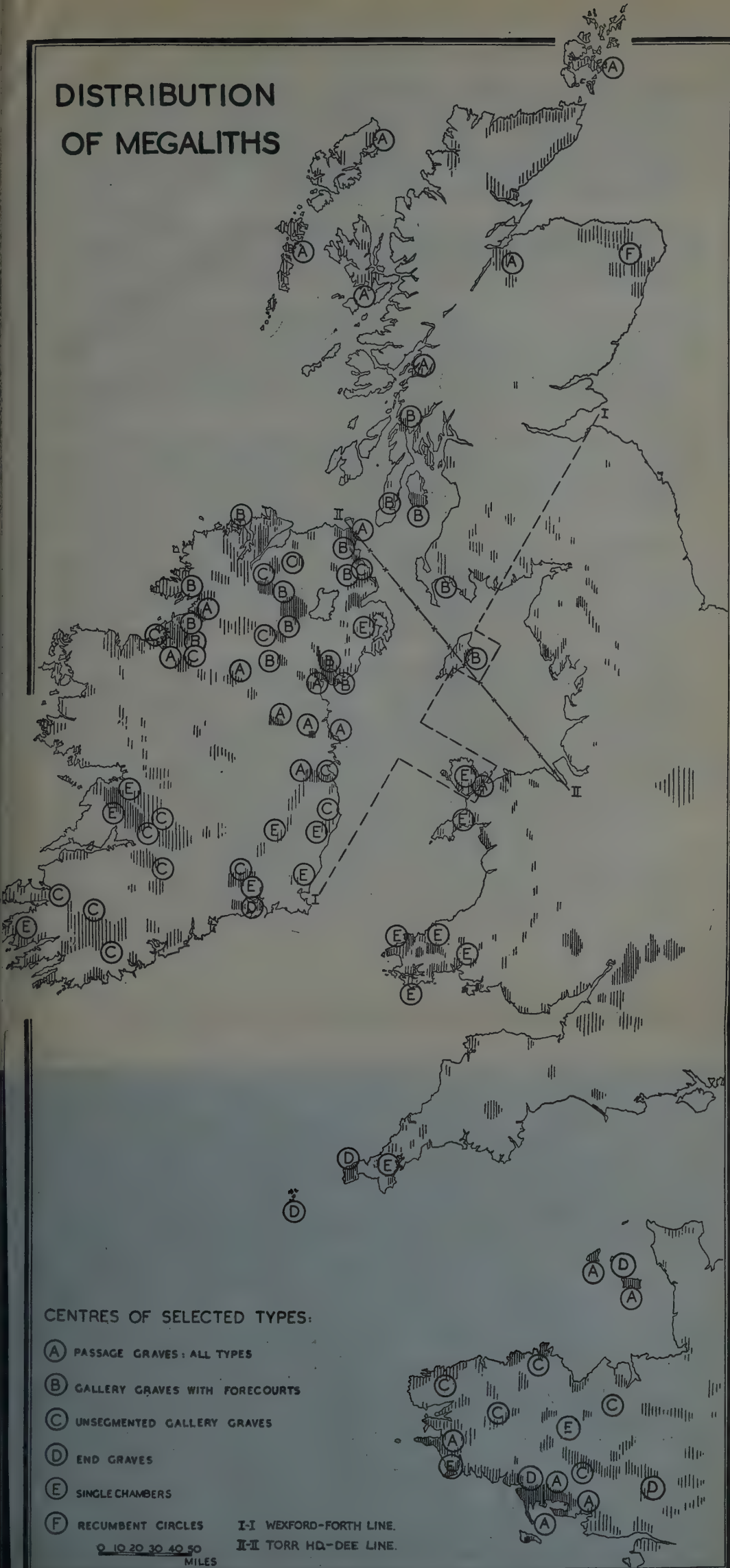
It is proposed to omit from detailed consideration the megaliths of Spain and Portugal, as well as those of southern France and Sardinia. All that is necessary is to remark that cultural stimuli from both these areas greatly influenced the rich storehouse of megalithic tradition found in Brittany, whence came the first megalithic builders of western Britain and eastern Ireland by way of the Irish Sea. These initial megalithic movements established two important areas of primary settlement—both in Ireland. In county Meath and in the Dundalk-Carlingford area, reaching thence westward across the country to Sligo and Donegal, and southwards within the foothills of the Wicklow mountains, was located the most important primary colony of passage-grave builders north of Brittany; while in northeastern Ireland, on the other hand, we have a primary focus of gallery-grave builders. The regions where these monuments are important have been marked A and B respectively on the map (facing p. 18). In the field, it would be noticed that whereas there were few intrusions of the gallery-grave into the passage-grave province, there are several indications of the intrusion of the passage-grave into the gallery-grave area, as, for example, in the extreme northeast corner of Ulster.

¹ G. Hartwell Jones, 'Celtic Britain and the Pilgrim Movement', *Y Cymmrodor*, 1912, xxiii.

² G. E. Daniel, *Proc. Prehist. Soc.*, 1941, vii, 1-49; C. F. C. Hawkes, *Prehistoric Foundations of Europe*, 1940; V. G. Childe, *The Dawn of European Civilization*, 1939.

³ C. D. Forde, *Proc. Prehist. Soc.*, 1940, vi, 170-6.

DISTRIBUTION OF MEGALITHS



CENTRES OF SELECTED TYPES:

- (A) PASSAGE GRAVES: ALL TYPES
- (B) GALLERY GRAVES WITH FORECOURTS
- (C) UNSEGMENTED GALLERY GRAVES
- (D) END GRAVES
- (E) SINGLE CHAMBERS
- (F) RECUMBENT CIRCLES

I-I WEXFORD-FORTH LINE.
II-II TORR HQ-DEE LINE.

0 10 20 30 40 50
MILES

DISTRIBUTION OF MEGALITHS



THE TRAVELS OF THE CELTIC SAINTS

We can now turn to those areas of distinctive megalithic burials outside Ireland where a particular type of monument appears to be dominant, and where it is clear that there has been little intrusion of other types. It must be noted that no emphasis is placed on the relative ages of the various monuments to be described. These vary considerably as many of the areas were settled very late in megalithic times, and in some instances as late as the close of the Bronze Age. It is the links between the various territories in which distinctive types of monument occur that are important for the present thesis.

The first area to be noted includes the Hebrides, Caithness, the Orkneys and the shores of the Moray Firth. This is an area to which the Irish passage-grave spread and is consequently labelled A. It would appear that the primary type of monument spread to this area in the first instance, but that several 'eccentric' types developed locally at a later period.

Next comes the gallery-grave region of the Clyde province. This includes the whole of the estuarine area of the Clyde and more particularly the islands of Arran and Bute and the long peninsula of Kintyre, with an outlying region in the northeast of the Isle of Man. It is clear that the tomb morphology of this province is quite distinctive and bears some resemblance in type of monument to the gallery-grave province of north-eastern Ireland and is, therefore, marked B on the map. Both areas possess Becharra pottery.

Before proceeding to discuss the remaining areas, it is significant to note that the main distribution of primary passage-graves and gallery-graves (A and B) lie to the northwest of a line (allowing for the transitional areas of Anglesey and the Isle of Man) running from Wexford Harbour to the Firth of Forth. Primary passage and gallery-graves of Irish type are unimportant south of this line; it separates two major cultural provinces of prehistoric northwestern Europe.

Returning to Ireland we find a fairly widespread distribution of unsegmented gallery-graves. They are usually of two different patterns: v-shaped (e.g. Keamcorravooly, co. Cork) and u-shaped (e.g. Clochuagalla, Boviell, co. Derry). Their chief concentrations are marked by the letter C. The pottery derived from these tombs suggests that they are early in date, but the chief interest for the present survey is that they are unimportant in the British area outside Ireland. Their closest parallels are in Brittany.

In the extreme southeast of Ireland there is found a special group of probable late passage-graves (e.g. Carriglong, co. Waterford) which are usually referred to as 'v-shaped passage-graves', or 'end graves'. These were clearly the tombs of an exotic community in southeastern Ireland whose strongest links were with Scilly and western Cornwall, and ultimately with the Channel Islands, Brittany and Vendée (4). The distribution of the chief concentrations are shown by the letter D. Excavation of some of the Waterford tombs has produced pottery sherds with cog-impression motifs suggesting late Breton beaker-ware. The pattern represented by the 'end graves' shows Irish-Breton links by way of Scilly and western Cornwall in contrast to the direct Irish-Breton link indicated by the unsegmented gallery-graves (C).

The remaining province indicating a distinctive type of monument introduces us to another and very late megalithic structure—the multiple stone circle with a recumbent stone. Such circles are found in a special region in northeastern Scotland (marked F on the map), which is more especially the area cut off by a line joining the mouth of the

⁴ T. G. E. Powell, 'A new Passage Grave Group in South-eastern Ireland', *Proc. Prehist. Soc.*, 1941, VII, 142-3.

Spey to Bervie Bay. The cultural material found in these circles suggests that they were erected in the late Bronze Age, but the style of the monument and its sepulchral nature link it to the tradition of the megalithic chambered tomb (5).

The above survey does not attempt to cover all the megalithic areas in western Britain, nor does it deal with all the varieties of megalithic monuments found within these areas. No mention has been made of the Severn-Cotswold concentration of trans-septal gallery-graves in long oval barrows (see map 1) not because they do not form a distinct regional group, but because this area was in the sixth and seventh centuries A.D. coming under Saxon domination and so played little part in Celtic Christian civilization. Furthermore, with the exception of the distinctive Aberdeenshire group, no mention has been made of stone circles, single chambers, menhirs and alignments of standing stones. These are all late forms of megalithic building and are, with the exception of single chambers, seldom found in the areas of primary settlement of the passage and gallery-grave builders. Single chambers are, however, relatively common in the interior of Ireland, but they are definitely more numerous southwest of a line joining Torr Head to the estuary of the Dee than they are to the northeast of it. This demarcation, which is of some significance, has been indicated on map 1, where the chief concentrations of single chambers (e) are also shown.

It should be recalled at this stage that there is considerable evidence for demonstrating that the Atlantic seaways which linked Iberia to Brittany, Ireland and Britain in megalithic times, continued in use throughout the Bronze and Early Iron Ages (6). In addition, judging by secondary burials dating from the late Bronze Age in megalithic barrows (7) and from the veneration and even Christianization of several megaliths in Brittany and western Europe generally (8), there must have persisted among the local population of the megalithic areas a continuity of interest in, and a particular reverence for, these great stone sepulchres throughout the two and a half millennia which separate the period of their erection from the Age of the Saints.

The scanty material which we possess for tracing the early history of the Christian Church throws little or no light upon the origin of the Church in the West. The first event of which we have any historical record is the persecution of Christians in the valley of the Rhone towards the close of the second century. This first historical evidence indicates the very close connexion of the infant Gallic church with the churches of Asia Minor and the Near East. It is well known that the commercial links of the lower Rhone corridor, with the eastern Mediterranean, go back far into the pre-Roman Iron Age and it is possible, therefore, that merchants first brought Christianity from Asia Minor into Provence by way of the Rhone entry. We possess little further evidence of the growth of the Gallic Church until the early days of the fourth century, when in 314 we have the records of the Council of Arles and the evidence they contain of the presence of Christianity in Roman Britain. Towards the middle of the century and possibly as a reaction to Constantine's adoption of Christianity as the official religion of the Empire, we have the rise of an ascetic movement in the western Church. St. Martin of Tours (316-397) is generally held to have been the pioneer of Gallican monasticism, and one of his disciples—Ninian—was the first to introduce monasticism of the Celtic type into

⁵ V. G. Childe, *The Prehistory of Scotland*, 1935, pp. 173-6.

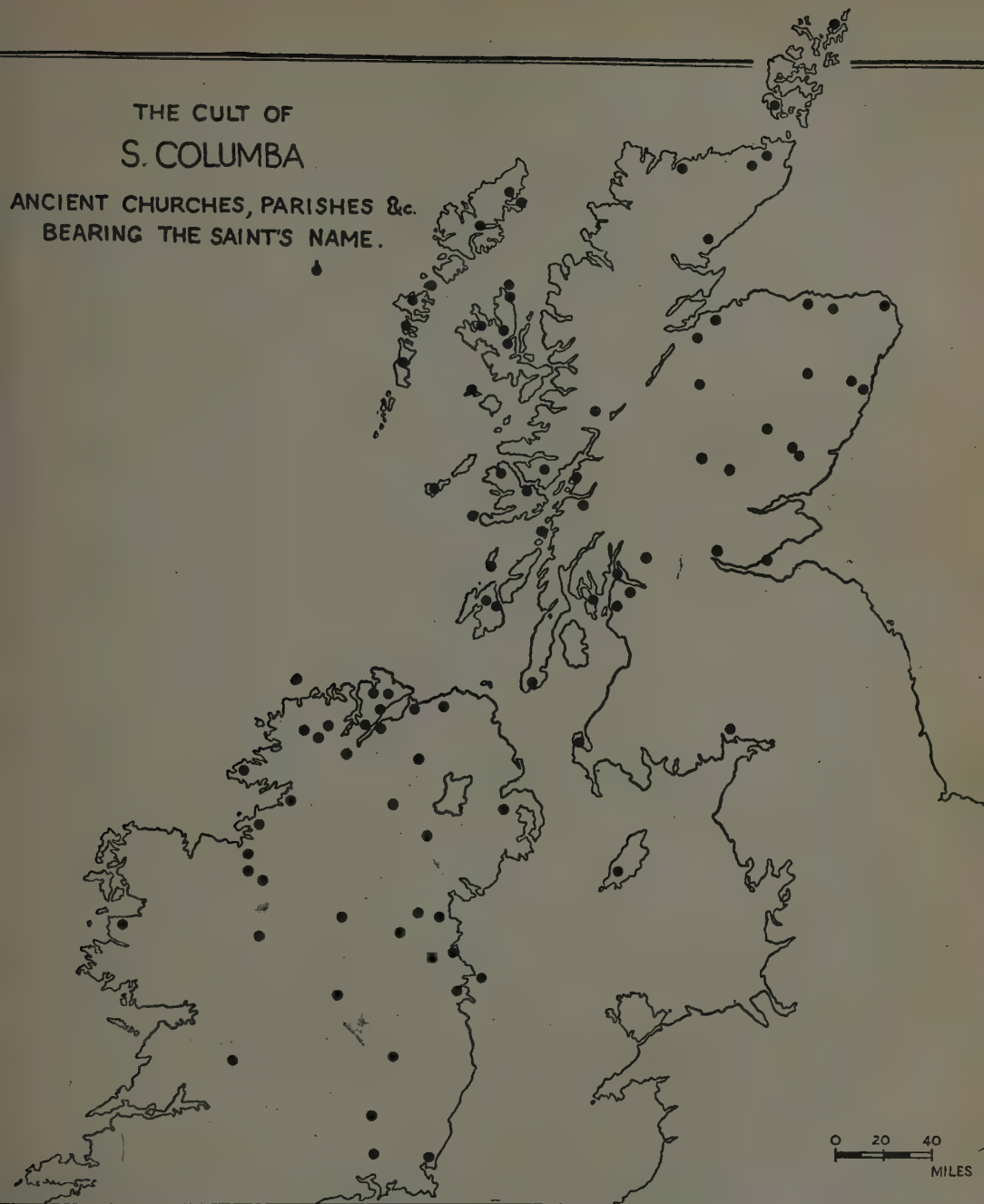
⁶ E. T. Leeds, *Archaeologia*, 1926-7, vol. 76, pp. 223-4.

⁷ H. O'N. Hencken, *Cornwall and Scilly*, 1932, pp. 40-2.

⁸ J. Fergusson, *Rude Stone Monuments*, 1872, pp. 24 and 346.

THE CULT OF
S. COLUMBA

ANCIENT CHURCHES, PARISHES &c.
BEARING THE SAINT'S NAME.



MAP 2

Britain. Martin and his followers were, however, only pioneers and we must not seek to find in them the Celtic monastic system fully developed. As Martin's influence was beginning to spread, the whole of the western Empire was overrun by barbarian hordes. In these difficult times those who sought monastic seclusion in Gaul repaired to the islands which lie along the coast of southern France and western Italy. It was in such centres as these that Christianity survived in the West, and from these cells a missionary effort went forth which brought the faith anew to the Atlantic seaboard of the continent (9). From Lerins and Marseilles Celtic monasticism spread westward through the Carcassonne gap to the Garonne, the Loire, and Brittany, and thence to Britain and Ireland. Here we have the revival of the old megalithic, Early Bronze Age, and tin traders' route to the north. Ireland and western Britain now acted as redistributors of Christian culture in much the same way as they had redistributed megalithic culture three millennia before. It is with these secondary movements involving Ireland, Britain and Brittany that we shall be concerned in our study of the spheres of activity of the Celtic saints.

The missionary power of Ireland is nowhere more clearly seen than in the life-work of the great Columba. He was born at Gartan in Donegal in A.D. 521. After studying at Moville, Clonard and Glasnevin we find him moving about the country founding in various places churches and monasteries, many of which, according to Celtic custom, still bear his name. The outstanding feature revealed by map 2 (page 21, which shows the distribution of his cult) is the fact that we are clearly dealing with the area of the passage-grave culture of megalithic times (A on map 1). In Ireland we note his dedications distributed around the Boyne; in Sligo and Donegal; and southwards within the foothills of the Wicklow mountains. In contrast, the sparsity of Columban dedications in counties Down, Antrim and Armagh is most significant. This is the core of the gallery-grave province of Northern Ireland (B); yet much in the same way as the passage-graves penetrated into the gallery-grave province and not *vice versa*, so we find numerous Columban dedications in counties Derry, Tyrone and east Donegal—territories which form a recognized part of the gallery-grave province. Just as the passage-grave people apparently possessed a powerful and dominant culture, so Columba possessed a powerful and dominant personality. His influence spread over wide areas. This becomes abundantly clear when we turn to examine Columban dedications in Scotland. They are well distributed over the whole area north of the Forth—Clyde lowland, to such an extent as to involve the megalithic provinces A, B and F. It is only to be expected that the founder of Iona should spread his influence throughout the old gallery-grave province of the Clyde (B) and in assessing the distribution of his dedications in Scotland it must not be forgotten that the Clyde region as well as the Aberdeenshire province (F) had almost certainly felt the influence of Ninian's mission from Candida Casa more than a century earlier (10). There is no doubt, however, that the outstanding feature of Columba's mission to Pictland was the Christianization of the region around, and to the north of, the Great Glen. As Mr Crawford has recently remarked: 'His (Columba's) missionary journey to the hill-fort of King Brude near Inverness, undertaken soon after 563, was a pioneer voyage of decisive importance' (11). It is not without significance for the present thesis that the whole of the country around the

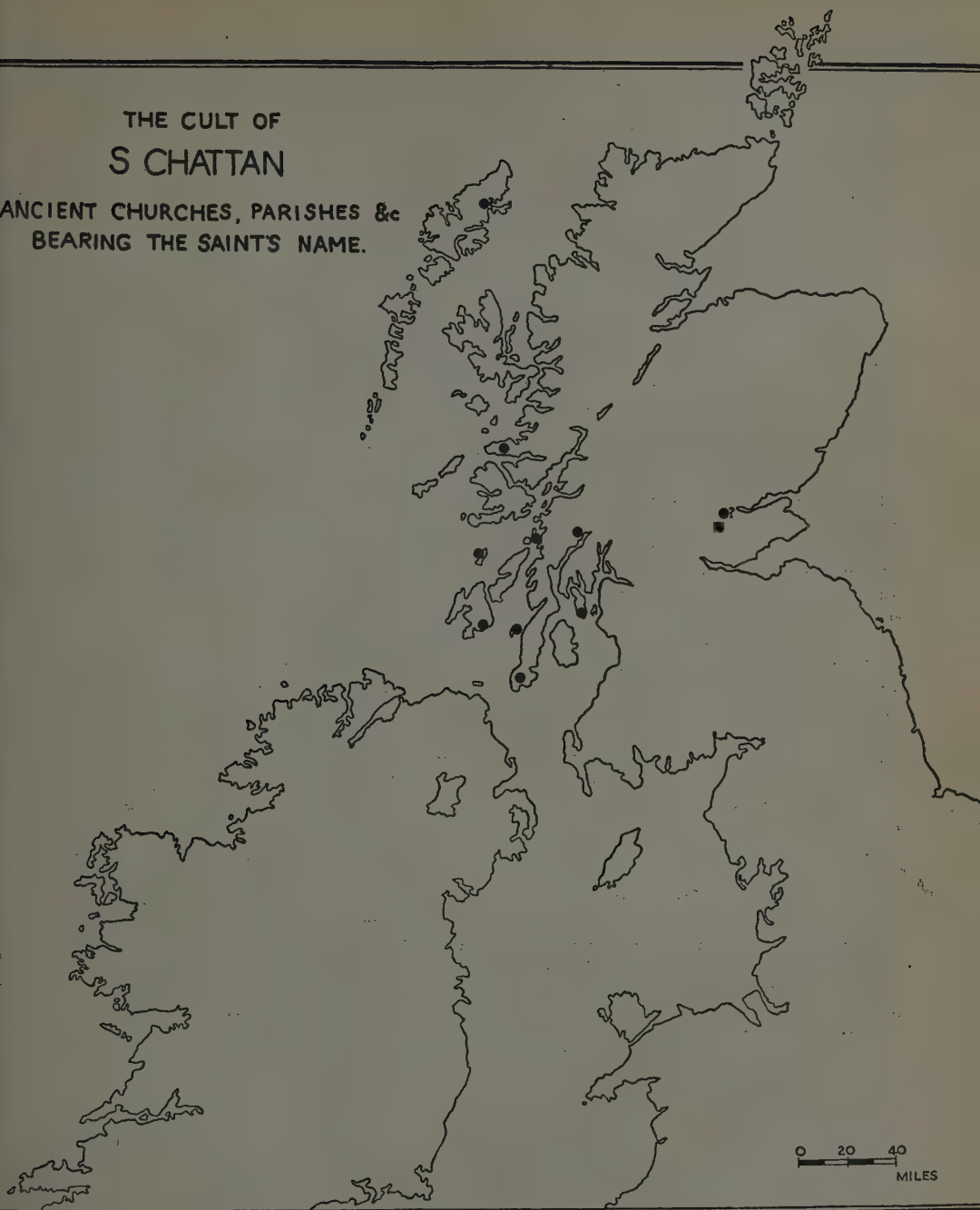
⁹ H. Williams, *Christianity in Early Britain*, 1912, p. 354.

¹⁰ J. A. Duke, *The Columban Church*, 1932. Dr Duke takes a moderate view of the extent of pre-Columban Christianity in northern and central Scotland as compared with W. D. Simpson, *Aberdeen Univ. Studies*, 1935, No. III.

¹¹ O. G. S. Crawford, 'Iona', *ANTIQUITY*, Dec. 1933, p. 453.

THE CULT OF S CHATTAN

ANCIENT CHURCHES, PARISHES &c
BEARING THE SAINT'S NAME.



MAP 3

Moray Firth (including Inverness) was one of the chief centres of the passage-grave culture in north Scotland (A), and must have been culturally associated with the Irish passage-grave province in megalithic times. In reviewing the distribution of Columban dedications in Scotland and Ireland we must not overlook the linguistic and racial links that existed between these territories at this time. These must have been factors of the greatest importance in determining his range of activity. If we possessed all the data we could wish for, it would undoubtedly be possible to explain the absence of Columban dedications in the extreme northeast of Ireland on linguistic grounds, but even so it must be remembered that linguistic distributions in these territories in the sixth century may be themselves but a part of the major problem under consideration.

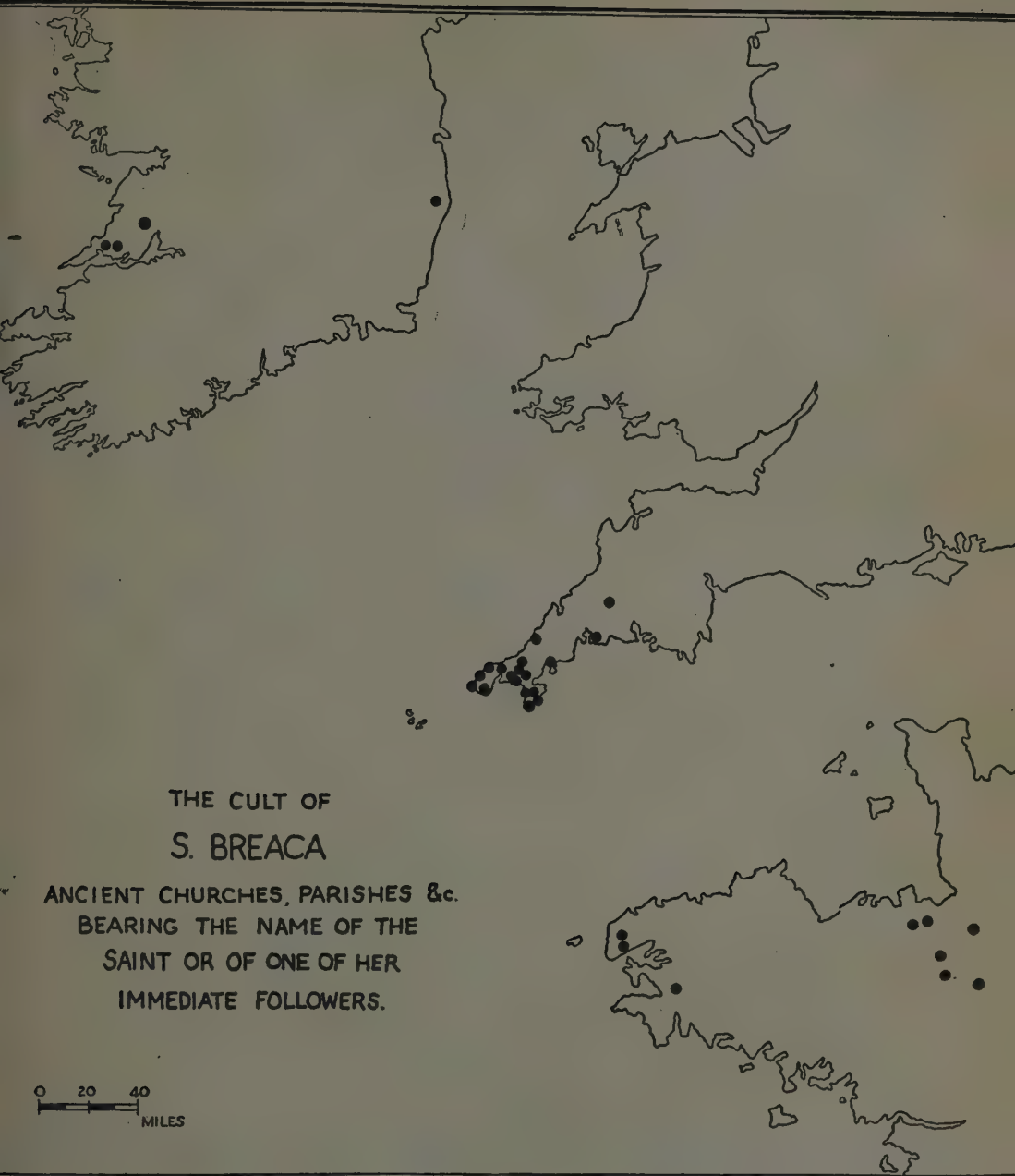
As an appendix to the study of Columba we turn to the distribution of dedications to a comparatively minor saint—Chattan of Kingarth (map 3, page 23). Little is known of his early life except that he was a member of a north Irish family. He migrated to the Clyde province and established several churches in those parts, of which the monastery of Kingarth, on the Isle of Bute, is the best known. The distribution of his dedications in western Scotland is a very clear example of the perpetuation of the individuality of the former gallery-grave-province of Clyde-land (B). The story of the life of Chattan indicates several close contacts with northeastern Ireland: not only was he born there but he is also reported to have been buried there, while during his lifetime he sent his nephew St. Blaán (who became his successor at Kingarth) to Ireland to be educated at the feet of St. Comgall of Bangor on Belfast Lough (12). These associations of Chattan with northeastern Ireland are reminiscent of the close cultural links that appear to have existed between the Clyde province and Ulster throughout prehistoric times. They were never more apparent than in the days of the megalith builders.

The works of Columba and Chattan are of unequal importance, but together they illustrate the spheres of influence of two typical 'northern' saints. It is worth noting how their spheres of activity lie strictly to the northwest of the Wexford-Forth line, that is more particularly within the primary areas occupied by the passage and gallery-grave peoples in the British area in megalithic times. The dedications attributed to many other 'northern' saints would produce a very similar distribution.

Attention must next be directed to the southern cultural province of megalithic times—the area lying to the south of the Torr Head-Dee line. Ireland, it will be remembered, figures in both provinces. We can consider at the outset the dedications attributed to a party of south Irish saints. Leland in his *Itinerary* quotes from the *Life* of St. Breaca, which he found in Breage church, Cornwall. The *Life* states that she was one of a company of Irish saints who arrived in Cornwall, among whom was the well known St. Senan of Inis Cathy. *Breaca venit in Cornubiam comitata multis sanctis, inter quos Sinninus, qui Romae cum Patricio fuit, Maruanus monachus, Germochus rex, Elwen, Crewenna, Helena* (13). Map 4 (page 25), shows the distribution of the churches dedicated to these saints in Ireland, Cornwall and Brittany. It indicates a number of important points. First of all there is no contact with South Wales. The linkage is southern Ireland-Cornwall-Brittany. Secondly, the Cornish dedications are, for the most part, in the extreme west of the county. If these saints used the trans-peninsular route, they used that of the Hayle river to St. Michael's Mount. This is the Irish portion of Cornwall. In Brittany they seem to have landed at different points and laboured in different areas—particularly in the territory behind the estuary of the Rance

¹² J. M. Mackinlay, *Ancient Church dedications in Scotland*, 1914, pp. 108-11.

¹³ Quoted by W. A. Phillips, *History of the Church of Ireland*, 1933, I, 229.



in Ille et Vilaine and along the western shores of the peninsula. We recollect the 'end graves' of southern Ireland and their close parallels in Scilly and southwestern Cornwall, as well as their presence in the Channel Islands and in western Brittany (D). The dedications attributed to Breaca and her followers indicate a distribution pattern which is possibly but an echo of a more remote connexion between these territories reaching back to megalithic times. In the early Christian period the centre of diffusion was in Ireland, but in the days of the megalith builders cultural movement was almost certainly in the opposite direction.

Direct intercourse between Ireland, on the one hand, and Brittany on the other, in the Age of the Saints is certain, but evidence is scanty. We know from the story of St. Winwaloeus that the crossing from Brittany to Ireland is referred to as a normal trade route. It is also clear that there were movements in the opposite direction (14), from Ireland direct to western France. St. Osmanna is said to have left Ireland and sailed to the mouth of the Loire and then, after many adventures, to have set up her cell in a forested area. The curious feature of her story is that it is the only example in the *Lives* of the Celtic saints where a direct reference is made to northern Spain. St. Osmanna is said to have visited St. Eclotomus who was well known in early Christian Spain (15). The direct link between Ireland and northwestern France implied in these accounts is also one of the distinctive associations inferred from the distribution of certain types of megalith such as the unsegmented gallery-graves (C). Megaliths of this type are not found in Great Britain.

Thus far we have considered the reflection in the Age of the Saints of two of the most clearly marked territorial associations (C and D) found within the southern major megalithic province. In both Ireland played a dominant rôle. It is now appropriate to consider a distribution which may be a reflection of those megalithic areas in the British Isles wherein single chambers are superior to all other types of monument (E). Single chambers represent an extension of megalithic settlement beyond the primary centres of the passage and gallery-grave peoples, and it is significant that the reflection of this distribution in the Age of the Saints has its centre of dispersion not in Ireland but in South Wales—in the great monastic schools of Llantwit, Llancarvan and Ynys Bŷr. Southern Ireland participates in this spread but does not initiate it.

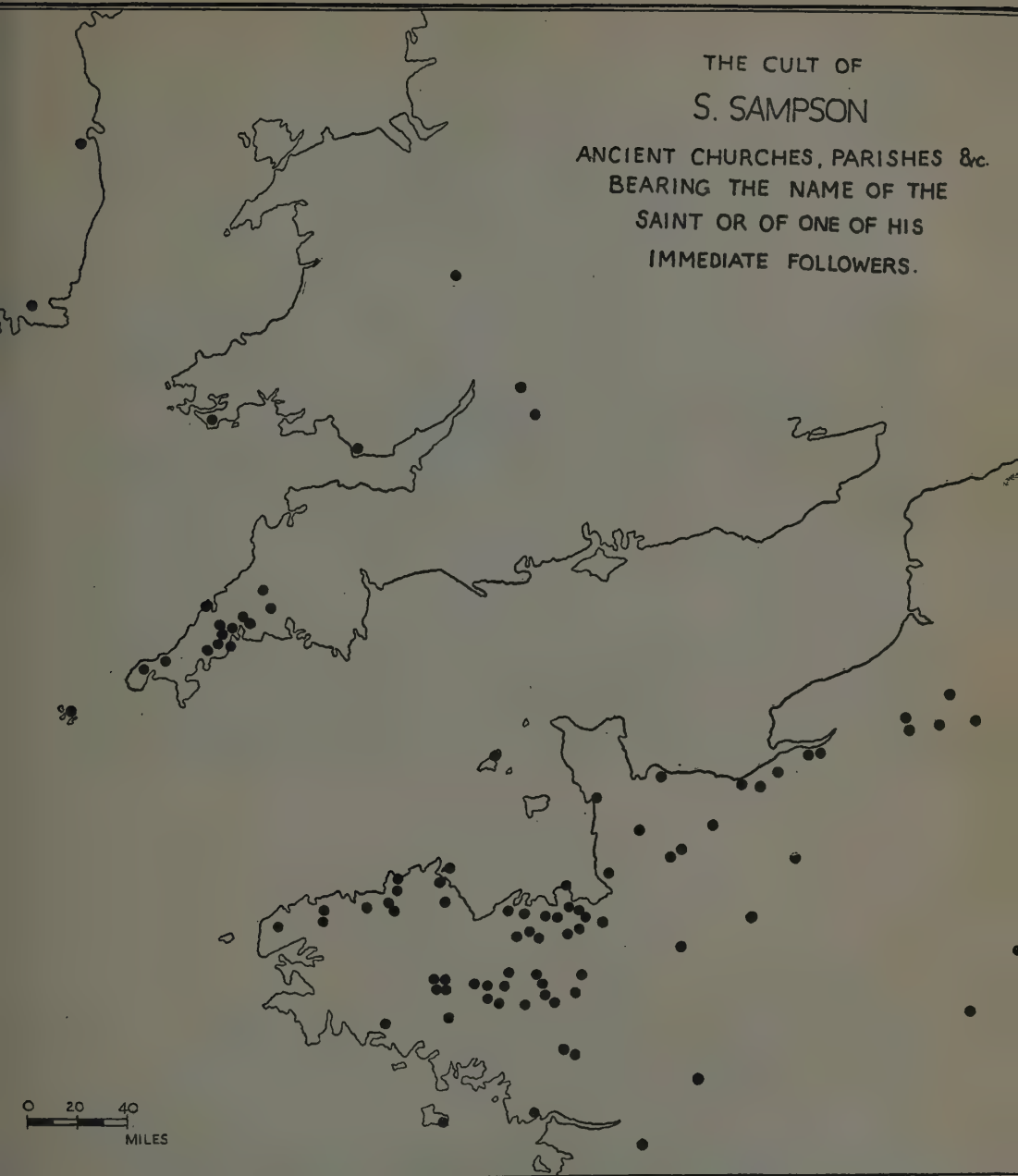
St. Sampson of Dol was a native of southwest Wales and received his education at the feet of the great St. Illtud at Llantwit. Subsequently, he became the head of the famous monastery on Caldy Island (Ynys Bŷr), off Tenby. There are churches dedicated to him near both these places. Later on Sampson went on a visit to Ireland and left his name associated with two churches in Leinster, one in co. Dublin and the other in south co. Wexford. It is not without significance that single chambers are the only megalithic monuments represented in south co. Wexford and there are several of them also in co. Dublin in the vicinity of the church dedicated to Sampson. Not long after his return to Ynys Bŷr Sampson had a vision beckoning him to missionary work across the seas (possibly to follow in the wake of so many of his fellow countrymen who were migrating to Brittany at this time), and he left South Wales for Cornwall *en route* for Lesser Britain. In Cornwall he landed near the modern St. Kew in company with many others. We know the names of some of them—more especially SS. Austell, Gwythian, Mewan and Winnow, and map 5 (page 27), shows the distribution

¹⁴ O. G. S. Crawford, *Western Seaways*, in 'Custom is King'—essays presented to R. R. Marett, 1936, p. 198.

¹⁵ W. A. Phillips, *op. cit.* pp. 230-1.

THE CULT OF
S. SAMPSON

ANCIENT CHURCHES, PARISHES &c.
BEARING THE NAME OF THE
SAINT OR OF ONE OF HIS
IMMEDIATE FOLLOWERS.



MAP 5

ANTIQUITY

of the dedications to these saints and to Sampson in Cornwall and Brittany. The interesting feature is that in Cornwall these dedications lie astride the Padstow-Fowey route, very few occurring in the extreme southwest of the county—that is in the area of the Irish (St. Breaca) crossing. There are dedications to Sampson himself at either end of the Padstow-Fowey route—at Golant and St. Kew, while in his *Life* (which is one of the earliest *Lives* we possess) there is a detailed description of his journey across the peninsula, including the story of his cutting the sign of the Cross on a standing stone near which he had witnessed a heathen ceremony in progress (16). After a time it would appear that Sampson and his wandering saints crossed over to Brittany. We know that they landed in the estuary of the Rance, and at the nearby site of Dol Sampson set up his headquarters. From this spot he and his fellow-workers moved over the countryside establishing churches, many of which still bear their names. His personal influence was great, like that of Columba in the northern province. His dedications are many and widespread but there is a marked concentration of them in Côtes du Nord and Ille et Vilaine (17) where there are also many single megalithic chambers.

Breaca, Osmanna and Sampson have been selected in this way from a host of other examples to indicate the associations existing during the Age of the Saints between the various territories forming part of the southern major cultural province of northwestern Europe in megalithic times. Their influence does not extend to the northern province, where Columba and Chattan laboured. On the other hand the missionary work of these two northern saints, like that of so many others who laboured in northern Ireland and Scotland, never encroached upon the southern zone. Thus it would appear that these major cultural regions of megalithic times still retained their individuality. In addition we have endeavoured to show that within these provinces may be found survivals of a more intimate association between special territories, evidence of which is found, on the one hand, in a further analysis of megalithic tomb morphology, and on the other in the distribution of dedications to individual saints and their immediate followers.

I wish to acknowledge the assistance I have received in the preparation of this paper from Professor H. J. Fleure, F.R.S., and Dr Margaret Davies, F.S.A., of the University of Manchester.

¹⁶ T. Taylor, *The Life of St. Sampson*, 1925. Translation, p. 49.

¹⁷ E. G. Bowen, *The Travels of St. Samson of Dol*. Aberystwyth Studies, 1934, XIII, map between pp. 66-7.

The Cave of Parpalló and the Upper Palaeolithic Age in southeast Spain

by V. GORDON CHILDE

THE Spanish slopes of the Pyrenees and the Cantabrian chains are rich in classic caves and galleries of art of the Upper Palaeolithic Age. In the southeast Spanish coastal belt, on the other hand, while many shallow rock-shelters are adorned with lively painted scenes, classed by Burkitt as Group II of the Cave Art, no complete or stratified record of the activity of old stone age hunters had been published till Prof. L. Pericot Garcia explored scientifically the cave of Parpalló in the Province of Valencia in 1929-31. The sumptuous publication* of his results, delayed of course by the civil war, is of exceptional importance as a contribution to fill in this painful hiatus in our knowledge but also for the very surprising results it records.

The cave in the flanks of Monduber opens on to an inland valley that debouches upon the coastal plain near Gandia (south of Valencia). The narrow chamber was filled with a relic-bearing deposit fully 8.50 m. deep. This accumulation was of a sandy nature and not divided up by stalagmite beds, compacted floors or sterile layers. The excavator had therefore to classify his finds according to arbitrary levels, removing the material in 25 cm. layers. Fortunately the relics were so abundant as to permit of the recognition upon this basis of nine main horizons, each characterized statistically by the prevalence of distinctive types, many of which fit so well into the familiar Franco-Cantabrian system that the latter can legitimately be applied to describe the Parpalló sequence. Translated into Prof. Garrod's terminology (i.e. using Gravettian for Auriñaciense superior), Prof. Pericot Garcia's main horizons may be presented as follows :—

Top		
IX	0.00 - 0.80	Magdalenian IV
VIII	0.80 - 2.50	Magdalenian III
VII	2.50 - 3.50	Magdalenian II
VI	3.50 - 4.00	Magdalenian I
V	4.00 - 4.50	Solutreo-Gravettian
IV	4.50 - 5.25	Upper Solutrean
III	5.25 - 6.25	Middle Solutrean
II	6.25 - 7.25	Lower Solutrean
I	7.25 - base	Gravettian.

In the basal levels the cave was still very narrow and the occupation probably only occasional since the yield of relics was low—only 15 worked bones (all simple points) and some 500 flints, but these included several good Gravette knife-blades and a couple of shouldered points. And already at this level the excavators recovered 18 engraved slabs and 11 painted ones, of which at least four bore recognizable representations of

* *La Cueva del Parpalló (Gandia): Excavaciones del Servicio de Investigación prehistórica de la excma. Diputación provincial de Valencia*, by Luis Pericot Garcia. Consejo Superior de Investigaciones Científicas, Instituto Diego Velázquez, Madrid, 1942, pp. 351 and xxxii plates.

The reference on p. 30 to Fig. 3 must be read as Fig. 1.

animals. The next metre, II, yielded 868 flints, which included half a dozen unifacial 'proto-Solutrean' leaf-shaped points, together with bone points as before and 172 engraved and 44 painted slabs including 60 definite representations of animals. The Middle Solutrean yielded 79 bone implements and 52 laurel leaves of flint. Some of the latter are trimmed on one face only, others on both. In the majority the secondary working is typically Solutrean, but in more than a quarter the flaking is coarser, recalling to Pericot the African 'Sbaikian'; between 5.50 - 5.25 appeared at least two unifacial points with a distinct central tang. The numbers of engravings and paintings had risen to 793 and 274 respectively, with a total of some 200 animal figures.

So far the sequence has been normal, but in layer IV surprises begin. The greatest is the discovery of no less than 46 tanged and barbed points, worked in Solutrean technique but in size, form and execution comparable to the finest arrow-heads of Bronze Age Britain! (FIG. 3). With these went a score of Solutrean laurel leaves, a pair of willow-leaves and a dozen 'Sbaikian' points as well as 231 backed blades with shoulders. Some of the latter look quite like the East European form represented so well at Kostienki while others 'are veritable microliths'. And indeed as a second surprise the author figures two certain micro-burins and two possibles! Forty bone points were recovered, comprising at least one singly bevelled at the base and another with a polygonal base, 770 engraved and 388 painted slabs including 110 animals. From V we have only five tanged and barbed arrow-heads out of 20,000 flints, but 168 shouldered points, a number of microliths and 7 clear micro-burins. 286 engraved and 170 painted slabs depict about 110 animals. We have accordingly a developed Gravettian culture superposed upon the specialized Upper Solutrean of IV.

But in the topmost quarter metre of V the excavator secured already a number of single-bevelled antler dart-heads including two engraved specimens identical with those of La Placard. From VI two exact parallels and 25 only slightly less typical are illustrated. Conversely of the 286 engraved and 170 painted slabs of VI there are still 39 animals of which 3 are painted. So the passage from Solutrean-Gravettian to Magdalenian seems quite gradual. But there is a real change reflected in figures. VI yielded 251 implements of bone and antler as against 142 in V; conversely above 3.75 the finely worked flints and microliths tend to give way to untrimmed blades, simple scrapers on blades and core scrapers. By VII we have no less than 864 bone and antler tools including one needle and three grooved bone points, 426 engraved slabs but only 53 painted showing 35 animals and 24 geometric patterns. Layer VII represents the most extensive deposit in the cave, yielding 1559 products of osseous industry including 6 needles, and 3 double-bevelled points, 1014 engraved and 78 painted slabs making 132 animals and 133 geometric patterns; a greater variety of flints including core scrapers, but also again microliths and a microburin and finally some quartz implements foreshadowing Asturian forms. The last horizon produced only 588 implements of bone and antler, including over 24 double-bevelled points and two rudimentary harpoons, 303 engraved and 27 painted slabs giving 65 animal and 25 geometric motives, but a fair number of good microliths comprising some triangles and even crescents as well as micro-burins and finally quite Asturian looking implements of quartzite pebbles.

The fauna, treated in a separate chapter, affords no additional help to the chronology of the site; for no extinct animals are represented at any level, and no significant changes have been observed. In all levels the most popular game was the Pyrenaean goat, after him in order of popularity came red deer, hare, horse, roe deer, wild ox and ibex. Wild boar, lynx, fox, and *Cervus dama* and some fish bones are poorly represented, but it is important that a few bones from Magdalenian I are attributed to some sort of sheep.

THE CAVE OF PARPALLÓ

This is in no sense a 'cold fauna', but indicates a climate not too unlike the present though perhaps moister; at least it implies woodland.

The discovery of a well-developed Solutrean culture so far south firmly fixed by stratigraphy in its proper place in the Upper Palaeolithic sequence is itself an achievement; for the older reports of Solutrean artifacts from southeastern Spain had been regarded with a certain scepticism. The discovery therein of arrow-heads in every respect comparable to the best neolithic and bronze age types is absolutely revolutionary. They provide the first unambiguous evidence for the use of the bow in Europe—an invention that many had thought was introduced in mesolithic times, at least in the West. It is worth insisting that the environment in which it was then used in Spain and



FIG. 1. ARROW-HEADS FROM THE UPPER SOLUTREAN ($\frac{1}{2}$)

consequently the game pursued by the archers were essentially the same as those that demanded its employment in post-glacial times when the large gregarious herbivores had been driven from Atlantic Europe too by the encroachment of forest. Almost as disturbing to accepted notions is the appearance in the same horizon of *micro-burins*, hitherto accepted in Europe as indicators of the mesolithic Tardenoisean culture. Finally the extension of a Magdalenian so closely parallel to that of the Franco-Cantabrian region is quite novel; no Magdalenian at all had previously been known in the whole of southeastern Spain outside Catalonia.

Much more exciting and no less surprising is the art of Parpalló (FIGS. 2-6). The cave yielded no less than 5968 slabs engraved or painted or both. On over 2500 indeed the lines seem quite random. In a minority representations of definite animals, or more rarely still explicit geometrical patterns can be recognized. Of the former deer are most commonly depicted, then goats, horses, and oxen. There are a few felines and *canidae*,

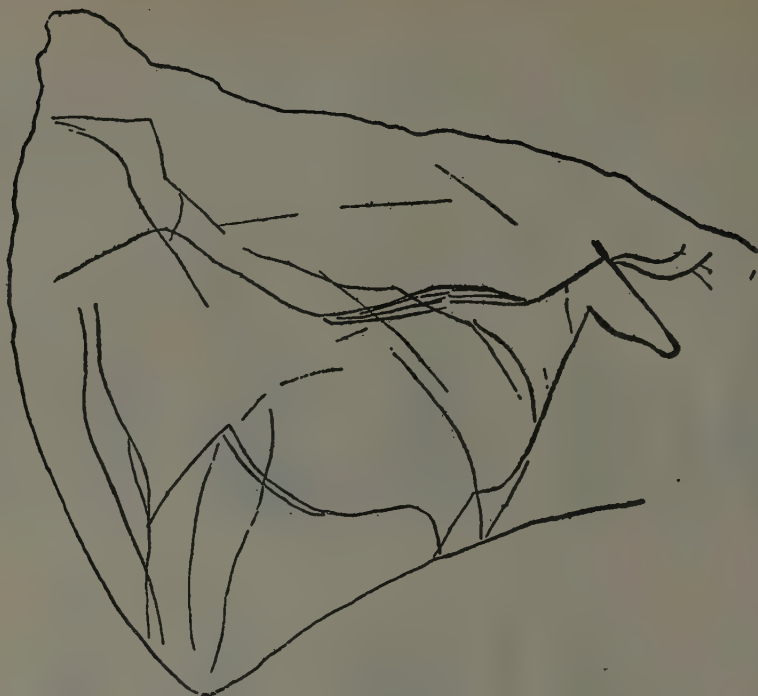


FIG. 2. ENGRAVING OF A BOVID FROM THE GRAVETTIAN LAYER ($\frac{1}{2}$)

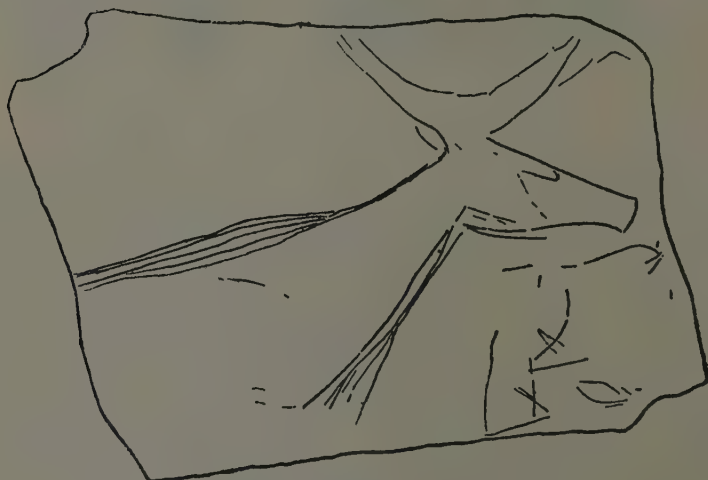


FIG. 3. BOVID FROM THE LOWER SOLUTREAN ($\frac{1}{2}$)



FIG. 4. GOAT FROM THE MIDDLE SOLUTREAN (†)



FIG. 5. SLABS ON WHICH SEVERAL ANIMALS HAVE BEEN ENGRAVED FROM MAGDALENIAN III (†)

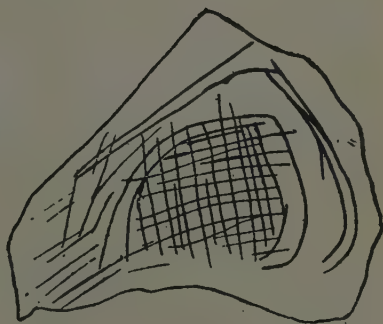


FIG. 6. GEOMETRIC PATTERN ON SLAB FROM MAGDALENIAN III (†)

one boar and one chamois. The animal may be outlined with engraved lines only, exceptionally with very broad graded lines giving the bas-relief effect termed by French prehistorians 'champlevé'; in two instances both from layer II the body within the outline has been scraped. The engraved outlines may be followed with outlines in red or black paint or the whole figure may be filled in with these colours. More rarely the figures are simply painted either in outline or in block. Prof. Pericot proves by detailed statistics that this artistic activity as measured by the number of examples per decimeter of the deposit increased up till horizon V, then fell off abruptly in Magdalenian I and II to rise again in horizon VIII. Judged by the percentage (62.2) of animal representations among the total of inscribed blocks the maximum productivity had been reached by II and began to decline already in IV to reach a new high percentage (29.6) in the topmost layer. To some extent, however, the relative decline of representational art in the Magdalenian is offset by an increase in the number of blocks bearing definite geometrical designs, which reach a maximum of 133 in Magdalenian III (VIII)—the next highest figure is 31 from the Upper Solutrean or layer IV. Finally painting was most extensively practised in the earlier levels and fell off enormously in the Magdalenian. Beyond this it seems impossible to establish stratigraphically a sequence of styles such as Breuil has deduced from superpositions for the parietal art of the Franco-Cantabrian region. On the contrary the same level may yield pictures in quite distinct 'styles' as a comparison between figs. 190, 192 and 195 for example will show at once. And if the Parpalló 'style' be compared with those of other provinces of palaeolithic art, it seems on the whole to approximate rather to the Franco-Cantabrian school than to the group II rock-shelter art to which, geographically, it would be expected to belong. In any case Parpalló has yielded none of those lively 'cinematic' compositions and scenes with human figures generally regarded as typical for the southeast Spanish group II style.

Many pretty hypotheses have been refuted by the experimental test of the Parpalló excavations. Old questions reopened have been added to the new issues raised by the novel material. In a long comparative chapter the author discusses these problems with great caution and great erudition, giving exhaustive citations from the relevant literature including several works that, having been published in Italy or France since 1939, are still unknown in this country. For the general prehistory of humanity the most critical issues are on the one hand the relations of the Upper Palaeolithic cultures of southeastern Spain to those of North Africa, the origin of the Solutrean and the chronological and cultural position of the group II art.

Once it was supposed that during the Solutrean and Magdalenian stages of Franco-Cantabria, southeastern Spain had become a colonial province of the African Capsian. This attractive theory, already badly shaken by Vaufray, has been finally demolished by the excavation of Parpalló. On the other hand Pericot accepts the micro-burins from horizons IV-V, reappearing again in IX, as proofs of real Capsian influence. The striking similarity of the geometric pattern on a slab from V to an engraving from the typical Capsian of El Mekta fortifies this suggestion. Conversely it was once almost a dogma that the Solutrean culture reached France from somewhere to the east, at least as far east as Hungary. But when the publication of Soviet excavations showed that there was no Solutrean at all east of the Dniester, even Hungary became a rather eccentric cradle that looks even less likely now that the culture's range has been extended to southeastern Spain. At the same time the Solutrean province has been joined on to the great African range of 'Sbaikian and Still Bay points that are also leaf-shaped and worked on both faces if not with the true Solutrean technique. Recognizing this, writes Pericot, 'it is not rash to suggest that eventually it may turn out that the complex of (Solutrean)

THE CAVE OF PARPALLÓ

bands whom we find in Europe, moving in upon peoples fundamentally Auriñacenses and coming armed with those magnificent surface-flaked points, came in the last resort from Africa'. But he proceeds to point out that 'nowhere else in Europe do we know so complete a series illustrative of the evolution of the Solutrean point as in southeast Spain'. There, he suggests, a European focus of the Solutrean might be located. 'Once admitting a focus at Parpalló, nothing hinders us supposing that the first impulse on the way to the Solutrean and successive contributions thereto might be received from the Sbaikio-Aterian foci of Africa' (he in fact assumes, what the Kharga expedition established, a fusion, if not identity, between the Aterian and 'Sbaikian cultures'). So the arrow-heads of the Upper Solutrean at Parpalló would be inspired by the similarly shaped Levalloisean points that characterize the North African Aterian. 'From them could be derived all the tanged points, including the Font Robert form, regarding them as translations into Auriñacense of the Solutrean'.

As to the art the excavations have shown that the earliest hunters at Parpalló painted and engraved animals not fundamentally distinct in style from some represented in certain rock-shelters of group II such as Albarracín. At Parpalló this pictorial tradition was interrupted by the intrusion of the Magdalenians from the north. 'The painters' he proceeds 'would have to take refuge in the mountains or further south. They continued painting in the shelters of the Levant and at some moment in their artistic evolution began painting human figures such as we have come to regard as distinctive of the group II art'. He concludes with a brief reference to an excavation, started in 1941, which, while it does not confirm the theory, does help to define the postulated 'moment'. The site is the cave of La Cocina situated in a valley rich in rock-shelters, adorned with paintings classically representative of group II such as are lacking in the vicinity of Parpalló. The painters must, the author thinks, have frequented the cave. It contains a deposit two and a half metres deep that yielded 'a very monotonous industry of geometric microliths and shouldered blades with some other elements of the upper palaeolithic tradition'. It would illustrate 'the stage which succeeds in the southeast the disappearance of the Magdalenians of Parpalló—a stage that would be the first phase of the evolution that led to the neolithic of the region with its abundance of microliths and cardial pottery'. I conclude then that the dances, battles, hunts and domestic scenes of group II art can at best hardly be older than late Magdalenian in terms of the French sequence.

The report is produced on nice paper and is profusely illustrated with admirable drawings and fine photographs. Over 500 line blocks supplemented by 50 photographs illustrate all the best engravings, while 65 sketches and four photographs are devoted to the paintings. There are only two plans but over a thousand artifacts are reproduced in 74 text-figures and 4 plates. Three statistical tables recapitulate the results of the stratigraphical observations minutely recorded in the text. But it is noted that about two-thirds of the flints are still awaiting classification. Professor Pericot is to be congratulated and has earned our gratitude not only for the care and skill with which he conducted the excavation and the brilliant fruits that rewarded his labours, but also for the completeness with which he has published his results and the mastery of comparative material with which he has used in analysing them.

Cornish Fish Cellars

by N. J. G. POUNDS

IN their annual migration from the warm waters of the North Atlantic, the pilchard shoals rarely travelled further east than the coasts of Cornwall and southwest Devon. Here they were caught in vast numbers and preserved, for export or use, in fish cellars which lay along the coast. The Cornish fish cellar was a building of highly specialized type, in which the pilchards were salted and pressed. With the gradual disappearance of the pilchard fishery during the nineteenth century the cellars were first abandoned, and then became ruinous or were converted to other uses.

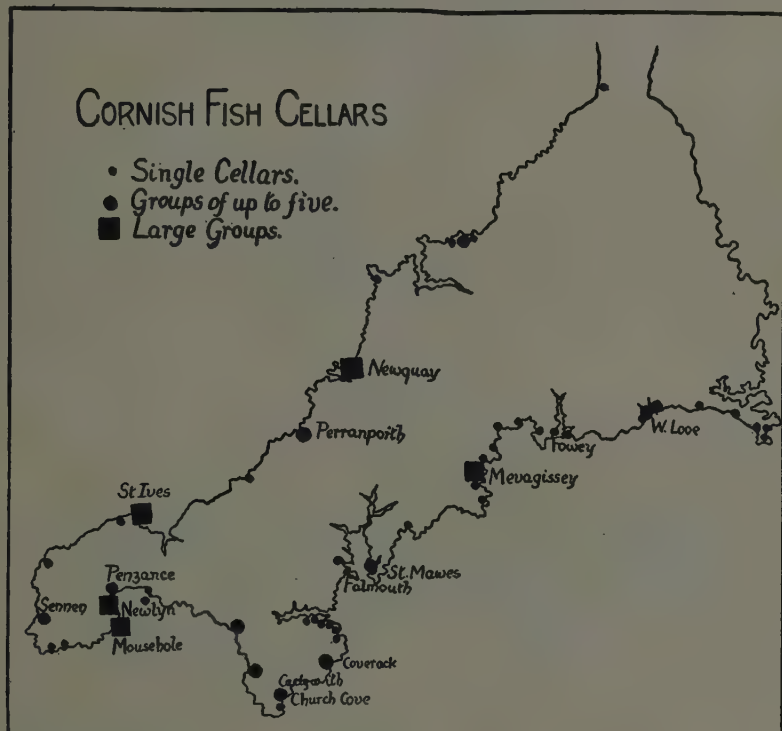
The earliest reference to the seine fishery is in a Taxacio of the vicarage of St. Goran in 1271, in which the rector reserved the tithe of the seines. Carew's description (1602) of the fishery is more detailed. He describes the fishermen with their boats and nets 'hovering upon the coast and . . . directed in their work by a balker, or huer, who standeth on the cliffside, and from thence best discerneth the quantity and course of the pilchards, according whereunto he cundeth (as they call it) the master of each boat (who hath his eye still fixed upon him), by crying with a loud voice, whistling through his fingers, and wheazing certain diversified and significant signs with a bush which he holdeth in his hand. At his appointment they cast out their net, draw it to either hand, as the shoal lieth or fareth, beat with their oars to keep in the fish, and at last, either close or tuck it up in the sea, or draw the same on land, with more certain profit, if the ground be not rough of rocks'. After they had been taken ashore the fish were then 'saved three manner of ways; by fuming, pressing or pickling; for every of which they are first salted, and piled up row by row, in square heaps, on the ground in some cellar, which they term bulking, where they remain for some ten days, until the superfluous moisture of the blood and salt be soaked from them; which accomplished they rip the bulk, and save the residue of the salt for another like service . . . those that serve for the hotter countries of Spain and Italy, they used at first to fume, by hanging them upon long sticks, one by one, in a house built for the nonce, and there drying them in the smoke of a soft and continual fire, from whence they purchased the name of fumados; but now, though the term still remains, that trade is given over; and after they have been ripped out of the bulk, reffed upon sticks, and washed, they pack them orderly in hogsheds, made purposely leaky, which afterwards they press with great weights, to the end the train may soak from them into a vessel placed in the ground to receive it'.

The process of smoking the pilchards was still in use sixty years later, and was mentioned by Fynes Moryson in 1617 and E. Leigh in 1659. The practice of pressing the fish into hogsheds, however, gained ground, and held the field undisputed through the 18th and first half of the 19th centuries.

Pilchard cellars were built round the coasts; seine nets, tuck nets and boats assembled, and the watchman was posted upon the cliffs to wait for the sheen on the water that marked the arrival of the pilchard shoals. These fish, 'the least fish in bigness, the greatest of gain, and most in number', as Carew called them, are usually off the Cornish coast in July. They may travel as far east as Devon, but the principal fisheries were west of Fowey. The arrival of the pilchard was always rather irregular,

CORNISH FISH CELLARS

the shoals being guided by the abundance of the crustaceans, on which they fed, and also by the temperature of the sea. According to Norden, the pilchard 'infinitely aboundeth upon the sea coaste of this Countie, especially in the South parte, at one time of the yeare, chieflye, that is, between St. Jeames tide and the feast of All Saynts; at what time they are taken of the countrye fishermen in such abundant manner, as, unless a man see the admirable drawghtes, he will hardly believe what is daylie scene'. On the other hand there were years when the shoals scarcely came at all; the huers waited and watched in vain, and the cellars were empty. A failure of the fishery caused distress



throughout the county, where the pilchard formed a staple article of diet, especially in the mining districts of the West. In good years vast quantities were exported, chiefly to Italian ports, and in 1847, as many as 40,883 hogsheads were sent from Cornish ports to Italy, with about 3,000 fish in each barrel. Exceptionally large catches were sometimes made, when the excess was either allowed to rot or was dug into the land as manure. In 1795, 65,000 hogsheads of pilchards were laid down, and in 1814, Mevagissey, always a leading town in the industry, alone preserved 11,000 hogsheads. About 1785, the industry employed during the season some 3,500 men, organized in 111 concerns, of which 12 were at St. Ives. The boats and gear represented a capital investment of about £130,000, and the cellars a further £80,000 to £100,000.

Pilchard seining and preserving were described by most of the travellers and

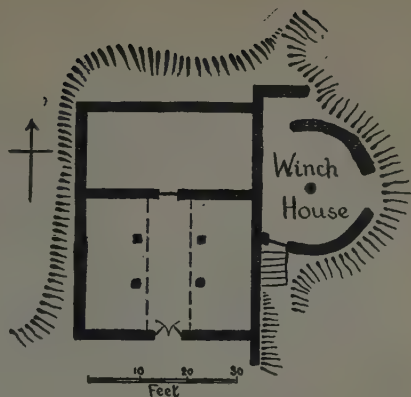
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topographical writers of the 18th and 19th centuries. The pilchards were taken from the boats in 'Gurries', or wheelbarrows, to the cellars, where they were laid in bulks, consisting of fish placed side by side, with salt between each layer. In this way a wall of pilchards two to three feet thick and up to six feet high was built. After the fish had become thoroughly impregnated with the salt, which took three or four weeks, the bulk was broken and the pilchards arranged in hogsheads. These were straight-sided barrels, and the fish were placed radially, until the barrel was full. The pilchards were then pressed. The method which obtained from the 16th to the end of the 19th centuries used a pressing beam and weights. The hogsheads, deliberately made leaky, as Carew described, were placed on a wooden platform or gutter against a wall. A little above their level in the wall was a series of small holes, into which the pressing beams fitted. The latter lay across the hogsheads, and their weight, increased by stones hung on their outer ends, pressed down the lid of the hogshead. The oil was pressed from the fish, oozed between the staves, and ran along the gutter to the receptacle in which it was caught. The hogshead was refilled and again pressed, until it would take no more fish. It was ready then for export. The train oil was sold for lighting, preparing leather and other purposes.

The primary requirement of the fish cellar was space for bulking and pressing; a strong salt store was also needed and there was usually space to store nets and other fishing gear, and not infrequently dwelling apartments also were built into the cellar. At its simplest the fish cellar was a rectangular courtyard, with strongly built outer walls and lean-to shelters against at least some of the walls. There was a wide entrance, and a salt store often lay in one corner or across the end of the yard. Two of the three cellars at Sennen were of this type, though little more than the salt store remains. The walls were of granite, and the lean-to supported at its outer edge by granite pillars, was thatched. Instead of a row of holes, into which the pressing beams fitted, the wall overhung about 6 inches, and the ends of the beams were placed under it. This modification probably resulted from the hardness of the granite and the difficulty of cutting holes in it.

In some cellars only the base of the courtyard wall consisted of stone, the upper part, above the level of the pressing beams, being built of cob, which was very frequently used in cottages. At Treath, on the southern shore of the Helford river, is a picturesque remnant of a cellar of this material.

Cellars varied in size, but the large ones were alike in having a central courtyard, open to the sky. At Newlyn is a well preserved cellar, measuring 52 feet by 50; three sides of the courtyard are covered, and the fourth abuts against a house, which may once have combined the functions of salt store and dwelling house. The spaces between the granite pillars of the courtyard were walled to a height of about three feet. At Treath and many other cellars, this protection against the weather was adopted. At Polkerris, on the eastern shore of St. Austell bay, is one of the largest cellars in the county. Its overall dimensions are 142 feet by 50. It lies across the head of the beach; across the ends of the building are large apartments that once served to house coal and salt. Through them are wide entrance tunnels, by which the fish were brought into the cellar. On the landward side, the courtyard wall revets the cliff and supports one side of a simple ridge-roof, whose inner edge rests on solidly built stone piers, alternating with granite pillars. Under this roof the fish were bulked. The opposite side of the yard is similar, but has an upper storey, in which the fishermen lived and stored their gear. On this side were the pressing beds. Polkerris was an ancient centre of the pilchard fishery; Norden, on his map of the Hundred of East, depicted a seine boat in action off the little cove.



Church Cove



Church Cove, Interior.



Cadgwith



Polkerris

N.J.G.P.

ANTIQUITY

The majority of the large cellars, especially those in the more populous western fishing coves, had upper storeys, which served as dwellings. The Newlyn example, already cited, has a flight of stone steps in the courtyard to the upper floor. In fact it became customary in the West to build houses round a hollow square so that the ground floor or undercroft might serve as a fish cellar. One of the most perfectly preserved cellars is at Church Cove, two miles east of Lizard Head. This cellar is even more interesting because it was described in use by Bonham and Johns. The courtyard is square and rather small, built of the local schist and paved with beach pebbles. A lean-to, supported, as usual, by granite pillars, lies along two sides. In a third wall is a wide entrance gate. A small overhang in the side walls held the ends of the beams. The salt house is large and well-built, of two storeys, with a door opening into the cellar. Against the eastern side of the cellar is a large semi-circular winch house, which was used to haul the boats up out of the reach of the waves.

In Cadgwith are four similar but less perfect cellars. Some have an upper storey over at least part of the pressing beds. At Coverack there are three, of which one is in a good state of preservation. There were also large cellars, now almost wholly destroyed, on the Helford and Gillan creeks, at Porthoustock, Porthallow and St. Mawes, and at many coves further east. On the north coast cellars were built at Zennor, St. Ives, Perranporth, Newquay and, less frequently, in coves further up the coast.

Most of the existing cellars were built in the 18th century; very few are later in date, though some may be very much earlier. In 1586 the Privy Council was made aware of 'certain cellars and stoarehouses built of late years on the cliftes and seacoast for the stoage of pilchards'. The cellars at Cawsand were built in the 1580's, and attracted the fish that had hitherto been sold in Plymouth. The Privy Council ordered the construction of cellars to cease, but in 1598 Richard Trevill extended 'the Pallies wales to Kosend' (Palace walls at Cawsand); the word 'palace' was used in East Cornwall and Devon for the fish cellar. Only four years after their first order, the Privy Council found that the seiners 'do erect a new kind of storehouse called lymrids'. Again an order was made to stay the building of 'new sellours, pallasess and lymrids'. It was of little avail, for in 1605, 'a cellar and Palace to the same adjoining' were built six miles further east, at Portweinkle. About 1620, there was 'a large decayed Pallace at the Parr' (the present site of the village of Par). The term 'palace' seems not to have reached West Cornwall, at least in popular parlance. In 1590, the Polkerris cellar was called a 'seine house', and at Goran, the cellar bore the unusual name of 'the Castle'. The term 'cellar' was more generally used in the west of the county, and deeds often refer to the 'house and cellar'. The preservation of pilchards in the west of the county was first carried out on a small domestic scale. The cellar or undercroft of a private house was generally used, and until the last century most families in Mousehole and Newlyn preserved sufficient pilchards for their own needs. In these western fishing villages there are still innumerable small cellars, attached to the houses of the fishermen. The preservation of pilchards on a large scale for export first began in the southeast of the county, where it was dominated by English merchant capitalists. At the end of the 16th century the Privy Council attempted to check the building of fresh cellars, because it did not want to see the pilchard catch diverted from the home to the foreign market. In the 17th and 18th centuries Fowey and Falmouth became centres for the collection of pilchards, which were sent to Mediterranean countries. With this westward extension of the trade, fresh large cellars were built in the western parts, where the West Cornwall name 'cellar' became attached to the 'palace', a building of East Cornwall or even Devon origin.

CORNISH FISH CELLARS

The bulking and pressing of up to 50,000 hogsheads in a single short season demanded abundant and large cellars. The fish were in bulk for three or four weeks, and each hogshead was kept under the pressing beam for up to a fortnight. The fish could not be kept waiting either to be put in bulk or pressed in their hogsheads, and the accommodation of the average cellar, such as that at Church Cove, cannot have been more than 40 or 50 hogsheads at once, even though every available wall space was used for pressing beds. There must have been a very large number of cellars, though it is impossible to find out how great the number may once have been. Old cellars were abandoned and new ones built. At Mullion there was a vigorous seine fishery, but the catch was taken to Newlyn for bulking and pressing, until cellars were built at Mullion in the 19th century. Over a hundred years ago, the Fowey fishery was abandoned; at the same time an attempt was made to establish another fishery at Pendeen, in St. Just parish. Cellars were built, but the coast proved too rocky and dangerous, and the project was abandoned. The map shows the distribution of fish cellars so far as they can now be traced, and it shows that the south coast predominated in the pilchard fishery. The poverty of cellars on the north is probably due to the rugged coastline, with few easy ways down to the water. At Zennor, however, where the cellars lay on the cliff edge, the fish were hauled up in baskets. Only in St. Ives bay was the fishery on a really large scale, though there were three cellars at Perranporth, four at Port Isaac, and twelve at Newquay. Cellars lay thickly on the shores of Mounts bay; they were clustered in Mousehole, Newlyn and Penzance. It is impossible to say how many there may have been in each, but five large cellars remain in recognizable form in each of the first two. Along the sheltered, east-facing shores of Falmouth and St. Austell bays almost every cove at one time had its cellar, and there may have been as many as twenty at Mevagissey. The sheltered water, the relative absence of surf and the lack of high cliffs produced almost ideal conditions for the fishery.

During the 19th century the pilchard catches, which had always been irregular and unpredictable, began to decline. With the improvement of transport and the further development of internal trade, the country people and miners became less dependent upon the preserved pilchard as an article of food. The export continued to be important, but tended on the whole to diminish. It was not extinguished until economic sanctions were imposed on Italy in 1936. Long before this, however, the ancient methods had completely passed. About 1877, the method of pickling pilchards in brine was adopted at Mevagissey, instead of the more laborious bulking process. Stone or concrete vats appeared in the few cellars that continued in use. Screw presses filled the hogsheads more expeditiously, and were adopted in most of the large fishing ports, replacing the ancient pressing beams and stones. It is a tragic coincidence that the three foundations of Cornish prosperity—tin, copper and pilchards—should all have failed in the 19th century.

My thanks are due to the many people, known to me and unknown, who have answered my questions and sent me drawings and plans of vanished cellars, and particularly to Mr R. Moreton Nance of St. Ives.

Museums and the Future*

by W. F. GRIMES

IT has long been obvious that a new policy is wanted for our museums and their buildings. The need, often discussed, now takes on a new urgency. The second world war has visited our cities with insensate destruction on a scale which we have hitherto associated only with Acts of God. Some of our museums have already suffered—and as yet we cannot say when or where more will be damaged or destroyed. Replanning schemes will see old museums rebuilt, new museums established in many places; and now, while such schemes are being blocked out, is the time to see that individually and as a body the museums are planned and developed to the best advantage. The necessary driving force must come from a comparatively small body of people. For as a nation we can hardly be called museum conscious: we have no official museum policy, and the local efforts which are the substitute for it operate so unevenly that a large part of the population is quite without a service which ought to be of great educational and cultural value to all.

No one therefore can discuss museums in Britain without first considering the general problems of policy and organization, particularly as they affect museums controlled by local authorities, which form the bulk of our museums and represent our attempt to equip ourselves with museums on a nation-wide scale.

The present system has, broadly speaking, a local and a general weakness. Usually the museum is controlled by a sub-committee of the local authority, made up of councillors and co-opted members, the former in the majority. Finance is in the hands of the council. The local weakness is that—as Markham so clearly shows (1)—control is thereby vested too often in men who have no interest or belief in the work their museum might do. Obviously the chances of achieving an active and enthusiastic committee under this arrangement must be highly uncertain, and even in comparatively large towns indifference and neglect are often the result.

Local weaknesses have usually a local cure—in this case the obvious one of reconstituting the committee with the 'right sort' of people, whether councillors or co-opted members, to develop a more progressive policy. Where economic and other circumstances (2) are favourable this undoubtedly would be the ideal solution. For where such committees have been properly constituted (from a museum point of view) they and their museums have done very valuable work.

But for the wider problem this answer errs on the side of simplicity. For small towns or other units with limited means would still be unable to meet their own needs properly, however great their willingness; and there would be no provision for other areas and places with special claims to museums which their scanty populations would not be able to fulfil.

It is a counsel of despair to suggest—as has been suggested—that in such localities already existing, but badly run, museums should be closed down and their collections dispersed. Such a negative policy would set at naught that type of museum which is closer to our life than any other, and which, properly developed, might mirror more satisfactorily than any other the varied scenes and events that have gone to make Britain.

For the adequate distribution of museums is not merely a question of relation to

* This is a much-reduced version of an article the bulk of which was written in 1941. Its substance is essentially unaltered, but its completion was prevented by war-time conditions.

¹ *The Museums and Art Galleries of the British Isles*, p. 22.

² But see also below.

MUSEUMS AND THE FUTURE

population. It goes without saying that all population units of a certain size should have their properly equipped museum. But often what may be called the museum-worthiness of a given town or natural area would justify the existence of a museum even if local resources were quite inadequate to the task of maintaining it satisfactorily.

The *local* value of such museums is immense even where their permanent population is small. Situated as they are in the midst of their country they provide the most efficient centres for record and research. As centres of education they keep before the eyes of their permanent public the value and importance of possessions for which day-to-day familiarity breeds something approaching forgetfulness and indifference. Their external influence would be even greater. By their very nature they attract widespread interest and attention amongst specialists in their particular subjects. And most of them would command a non-specialist population of tourists and visitors far greater than that actually living round them. Such areas will be known to most people; they are common in, but by no means confined to, the Highland Zone. They have a wealth which cries out for museum treatment. Yet apart from rare town museums their museum experiments have been sketchy and inadequate, if not positively harmful. For with the best will in the world small authorities can neither initiate nor support an adequate museum unaided; and the days are numbered even of those museums which, once established, are fortunate in the possession of voluntary workers with the necessary time, interest and knowledge to make the museum efficient.

The creation of regional authorities (which has been widely canvassed for reasons that have nothing to do with museums) would remove these financial difficulties. But here we may still come up against those 'other circumstances', in which large authorities unimpeded financially are backward and indifferent: the large coastal towns of Wessex for instance. Of them, Portsmouth alone has shown any sign of a museum policy in recent years. Southampton and Bournemouth have remained hopelessly static, although within easy reach of the New Forest, one of the most interesting areas in the whole country (3).

The plain truth seems to be that in these and many other places we cannot rely on local initiative, either now or in a future sufficiently near to make an effective contribution to the system of education which should accompany post-war reconstruction. The weaknesses of our museum system, financial and organizational, are of the sort that cannot be dealt with by unrelated local bodies, however large. Nor will they be overcome by an Act of Parliament imposing on authorities the obligation of providing museums, unless one of the provisions of the Act allows for the correlation of their efforts. The need is for a central organization which shall not only overcome the financial problem by

³ Actually a New Forest Museum should be established independently at Lyndhurst and its arrangement and care would provide a heaven-sent opportunity for an active curator who should be a naturalist with a geologically-minded archaeologist as his assistant. But this does not absolve Southampton and Bournemouth from the charge of having failed to develop their contacts with it. There appears to be some hope that the expansiveness induced by replanning projects may result in a more positive policy in Southampton in the future, although the bulk of its potentially useful historical collection had been allowed to remain in a situation of great danger until the summer of 1941. In Bournemouth the fight for an adequate museum has been waged at intervals from 1906 to 1931, and came nearest to success in 1906, when property was bought which has ever since been leased to private persons, instead of being used for its advertised purpose. The latest campaign, led by Mr J. B. Calkin and fully and sympathetically publicised by the local press, found the City Fathers unmoved to more than lip-service by all arguments, whether based on the urgent need to save valuable local collections for the area, on cultural and educational needs, on local patriotism or self-interest. Bournemouth has a population of over 100,000 people. A penny rate brings in over £5000 in a year.

dispensing state funds but also provide the machinery for the planning and co-ordination which every national service needs if full use is to be made of it.

This suggestion of a central authority is not of course a new one. A central authority of a sort was indeed established on the recommendation of the Royal Commission on National Museums a few years ago. But the Standing Commission (4) set up is concerned only with the national museums; it could not materially affect the general museum position as long as national and provincial museums are treated as distinct, instead of as complementary parts of the same service. The very limited powers of the Standing Commission would seem to prevent real development, even if its scope were very much widened. What the museums rather need is surely a unit which on the one hand is linked to the State, on the other is largely controlled by the museum world itself through specific councils, boards or committees.

The all-important question is the nature of the link with the State. At present the only department which could undertake the work is the Board of Education. Its claims are strengthened by the fact that it is already responsible for at least one of the National Museums. The Board does not at present, however, provide for the general aspects of culture which extend beyond the limits of education in its narrower sense; and in many quarters the need has been expressed for a Ministry of Culture to embrace all the varied activities for which there is now no official provision. Such a need might be met by the creation of a new department, or better by enlarging the scope of the Board of Education and giving it a new title, avowing its claim to deal with the wider fields of culture.

The organization so set up might consist of a series of units each self-contained and essentially self-governing, but with provision for co-operation where necessary. Two such units would be a Museums Department and a very much strengthened Department of Antiquities, as well, no doubt, as others dealing with the arts and the sciences in their non-industrial aspects.

In relation to these the care of the museums would be a complementary undertaking. They are the storehouses of research-material and would therefore act as study-centres. They would be the medium for liaison in their various areas—as it were local agents who would maintain close contact with a series of correspondents and so keep in touch with local developments and discoveries. Above all, they are the instruments of education by which a wide range of knowledge can be passed to all classes and ages.

The criticisms provoked by such proposals for centralization are well-known. It cannot be too strongly emphasized that *the aim of the central organization must be not to set up any kind of control over the workers in any particular field, but to carry out the national tasks which no individual or society can deal with.* The administration must be designed to encourage individual freedom for development within the framework of a constitution aiming at co-ordination of the general result.

To take the central organization first. Its first duty would be responsibility for planning the distribution of museums on the lines already advocated. It would allocate

⁴ As the only permanent official body concerned with museums in any general sense the Standing Commission has had thrust upon it by circumstances executive and initiatory functions which it does not constitutionally possess and which therefore it performs half-heartedly and belatedly. In December 1941, some months after the worst air-raids (up to that time) had ceased, it was circularizing museums in target areas with offers of help in the evacuation of important specimens—and this, apparently, not from any inner conviction, but on the representations of the President of the Museums Association. The Commission cannot of course be blamed for this delay. The fault lies with a 'system' which either ignores the national interest or leaves it to the accidents of a fluctuating local enterprise and foresight.

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grants from state funds to help out local contributions (5). It would act as an information bureau by which local museums in difficulties could be given advice or put into touch with the appropriate expert ; and as a clearing-house by which new ideas and developments could become quickly and widely known. As part of this work there would no doubt also be the care and issue of official publications dealing with museum matters, and of general publicity and propaganda in addition to that of the museums themselves. Yet another task would be the organization and maintenance of records and of a catalogue of museum collections, thus providing a centre for the museum aspects of research. As part of this function it would be desirable to establish a library.

The actual performance of these and similar duties must obviously fall to permanent officials. But while the Museums Department must be answerable to a Minister of State, the control of its activities must be vested mainly in the museum world itself, though a representative body or board composed largely of persons of acknowledged authority and experience in museums, but with a leaven of other interests to give the necessary breadth of outlook. Special problems would be dealt with by *ad hoc* committees in which the day-to-day experience of museum-workers would be pooled and utilized. All such bodies should be subject to a system of periodical re-election. The much dreaded danger of bureaucratic tendencies can best be met by keeping the centre in direct touch with the most recent developments in the world of practical ideas and action (6).

To a central organization with functions thus defined, in the working of which the museums themselves would play their part, the administrative organization of the individual museum would be complementary. The need here is for administrations representative of the widest range of cultural activity in each area, so as to establish the museum in the most intimate contact with its surroundings, ensuring that it would reach its widest public and be kept informed of discoveries in its locality.

The well-tried system of committee control remains the most suitable one ; but the committees should be on a broader basis than in the past, and the local authority should no longer hold the majority vote. The committees should include representatives of local authorities ; of the full range of educational interests in the area ; of scientific and cultural societies of all kinds ; of industrial organizations ; and of individuals whose record and interests qualify them for the work.

The basic constitution should be applied with flexibility ; and there should be a well-defined policy in the selection of individual representatives. Every attempt should be made to preserve existing features which make for growth and individuality.

Successful museums would therefore continue to function undisturbed, as they do at present, except for the widening of the representation on their governing committees. It would obviously be a backward step to interfere with the institutions which most

⁵ The aim being to produce an efficient museum service factors like past record and the presence or absence of local initiative are irrelevant in the apportioning of grants. It is illogical to expect existing museums to improve or new museums to appear when the wherewithal is lacking by which alone improvement and development are possible. The vicious circle which leads from neglect to a steadily deepening indifference must be broken by a state grant attended by statutory obligations on the authorities in the area. The resulting appointment of a trained curator with proper equipment, combined with a responsible administration, will automatically raise the standard of the museum without the imposition of external controls or conditions. To those who question whether such a policy would be successful the answer is to be found in just those museums which at present are provided with trained staff and an enlightened governing body.

⁶ It may be that the central unit should work through regional bodies covering areas like those of the present Federations. This question should be considered.

nearly attain our ideal of progressive museums owing their vigour to their self-dependence rather than to dictates from without.

Similarly, society and other museums which come under the scheme should receive special consideration. The Society would receive special representation on the committee, and where the basis of its local representation was wide enough might even be given full trusteeship. Thus would be provided a new opportunity for the active members of such societies, whose days as museum-owning bodies appear to be drawing to a close. Their work could be turned to good account in the cause of a museum no longer handicapped by inadequate funds, providing them with a centre for their activities and placing their results before a wider public than they could otherwise expect to meet.

Much of the weakness of present museum organization is due to unsuitable *ex-officio* appointments to governing bodies of which local councillors (not always, but in many cases) are but one example. Holders of public office are not necessarily best fitted to deal with the affairs of a specialised organism like a museum; social standing and family connexions are not always a guarantee of active interest in cultural things. Much of the blame for this lies with the bodies responsible for the appointments. They should be urged in future to view the appointment as something more than a formality by considering carefully the qualifications of their representative.

In the greatest museum of all these weaknesses can only be removed by Act of Parliament. Under the Act of 1752 the chief control of the British Museum is still vested *ex-officio* in high officers of Church and State; and the representatives of the families of the donors whose gifts form the nucleus of its collections remain members of its Board of Trustees. This projection of the 18th century into the changed conditions of the 20th is indefensible. If the British Museum is to play its rightful part in the post-war scheme its governing body must be reconstituted to allow of a more positive policy affecting its buildings, the splitting up of its collections into manageable units, and the use of its accumulated surplus for the benefit of the country as a whole.

Any proposal which uses the words 'co-ordinate' and 'centralize' normally evokes a storm of protest and dissent, from those for whom 'local enterprise' is always sacrosanct and inviolable. It cannot be denied that the situation of the museums bristles with difficulty. For the problem is not the relatively simple one of erecting a completely new structure where none—or at best an obsolescent—existed before; but to wed an existing structure, the best parts of which are flourishing and vigorous, to a new one which shall have provision for growth and development not inherent in, perhaps even contradictory to, the old.

It is probably true to say that in other spheres planning attempts based on a central organization have usually failed because excessive concentration at the centre has killed all life outside. But it should not be impossible to learn from these failures and to avoid them in the future; the scheme outlined above is one attempt to do so. It provides for the financial aid from the State which is now generally agreed to be essential if our museums are to grow at all, and for the central unit as an active body properly equipped to undertake the varied tasks without which ordered growth will be impossible. But it carefully limits the functions of the central authority to national duties, and seeks to provide each museum with a constitution which will enable it to function as much as possible as an entity, yet with an awareness of its place in a wider system and with ways of bringing its influence and experience to bear at the centre. Such a scheme could obviously not come into existence at once, if only because of the lack of sufficient trained personnel for the necessary expansion. Its building up, and therefore its initial cost would take some time to complete. The more urgent tasks connected with existing museums should obviously be faced first.

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The part which the museums might play in the re-ordered future cannot be over-emphasized. That is why in this article I have concentrated on their more limited field as portrayers of the human and natural history of our own country : they can do much to forward the policy of mental re-alignment which must accompany material changes if the latter are to secure permanent success.

This is an aspect which re-planners do not appear (as far as I am aware) to have considered adequately. They talk of such questions as slum clearance and the preservation of amenity. But they have not considered, or at any rate have not emphasized, the fact that the deterioration in material and environmental conditions has been both accompanied and encouraged by a deterioration in the mental attitude of our people. We are, in short, achieving the countryside and environment that we deserve because we have concentrated too narrowly on economic at the expense of social values. Too many of us have become simply wage-earners ; we have been taught to earn our living, but no one has tried to teach us how to live.

The result is the creation of an immense mass of people with no scale of values away from the artificial standards of their towns, who have inevitably become a fruitful field for the exploiter. Speculative builders and rate-conscious local authorities have provided them at their different levels with dwellings which outrage all standards of decent conduct in themselves and in their impact on their countryside. Industrial designers have inflicted on them a wide range of noisome products which, modernistic and ' antique ' alike, are justified with the statement that ' this is what the people want '. The people as a whole, not knowing what they want, take what they are given.

As a whole, too, they have accepted without protest the waste and spoliation that have resulted from policies of so-called development which are summed up in the neglect of agriculture and in the uncontrolled spread of industrial activity and ribbon building.

Such a state of affairs would not have been as widespread if our educational system had set out to combat it. Active minorities of enlightened and far-seeing people have of course been fighting it for years. But whatever their local successes they have in fact been voices crying in a wilderness of more or less complete official indifference. The evil once again is on a scale which local efforts cannot be expected to touch ; what is wanted here is a national policy of education with two aims.

On the one hand future generations in town and country alike must be encouraged to view the land as one of our greatest heritages, to be valued as a great source-book of human history, as one of the forces which have influenced our growth and as a storehouse of scientific knowledge, no less than for its scenic beauty, its recreational value, and its economic wealth.

The second aim of educational policy must be to re-establish over a far wider field standards of taste in the everyday things of life whose decline was due partly to the failure of modern industrialists to come to intellectual terms with its technical achievements, partly of the social weakness in our educational system which we have already noticed. The efforts of individuals should be augmented to include appreciation of the principles underlying good design, whether in architecture, which is the most important of the arts in its bearing on natural amenity and everyday life, or in the crafts.

It is here that museums have their special place as active instruments of education for modern living. They are several degrees nearer reality than the world of the classroom, displaying the activities of nature and of man, and the scientific syntheses that grow from them three-dimensionally through their ' things ' against the two dimensions of the best of pictures or the descriptive power of books.

But their potentialities will remain unexplored unless several changes are made.

ANTIQUITY

First, education authorities as a whole must change their attitude towards the museum. Only in comparatively few places have the authorities developed the kind of arrangement that ought to exist everywhere between museums and educationists.

Even in well-endowed areas the visit to the museum is frequently a haphazard affair, an isolated event inadequately prepared for and regarded as a welcome break from lessons, rather than as a lesson of a particularly vivid and enjoyable kind. Ideally, of course, museum demonstrations should accompany at some stage all classroom work in natural science and early history and art. Equally ideally, the teacher should establish close contact with the museum authorities and should acquire a ready familiarity with their exhibits which should enable him, who best knows his class's attainments and needs, to do much of the demonstrating himself. The fact that this is often done by individual teachers at present encourages the belief that many more would follow if they were given the facilities—if, for instance, the authorities made museum visits a matter of regular policy, and the museums arranged demonstration-courses for the teachers themselves and kept the schools closely informed of all museum developments.

There must be much closer relationship between case-specimens and their natural context. This means not merely more habitat groups and reconstructions, but greater emphasis on the general setting in which humanity has developed. Even in the natural sciences there are still far too many cases of fossils, birds and other specimens completely divorced from life, with too much emphasis on the taxonomic aspect, too little on the ecological, which is that which impinges more directly on the experience of the ordinary individual. Larger museums must obviously cater for both sides; but smaller museums whose emphasis apart from possible special subjects lies in their educational work might well make the habitat group and similar exhibits the centre of their system, from which all else would spread. They will succeed in their educational purpose to the extent that they establish science in direct contact with the reality of everyday experience.

But if rocks, plants and animals inevitably evoke the world of nature it is otherwise with man of an industrial urbanization. While on the natural history side the curator will seek to provide an understanding of the countryside in its own right, on the human side he has a dual task to perform. He must recast the collections of isolated specimens not merely to tell a coherent story of human growth, but to tell it against its background, illustrating the part which natural conditions have played in the story, showing how human activity has produced the countryside of today—and with a tailpiece on responsibility for present and future.

This result can be achieved by a much closer association of the exhibited specimen with the place in which it was found; by a greater use of maps and illustrations of all kinds, by models and reconstructions (of excavated and unexcavated sites) which shall bring the outer world into the museum. And the whole should be fitted into a general framework the purpose of which must be to show how man and nature have reacted upon one another at different periods, how even the most modern-seeming of our towns and cities owe their beginnings to 'natural causes'. There is hardly a place or district in the country where such a theme could not be developed. And too often the later phases would read their own lesson.

Secondly, the museums should develop a more positively critical attitude towards their exhibits when they illustrate man's handiwork. The present tendency to deal only with the factual aspects should be augmented by critical comment on the object itself, the quality of its workmanship, the right or wrong use of its materials, its fitness for its purpose. The aim of this policy would be to develop a critical outlook in the ordinary observer. It should therefore be applied not to all specimens, but to isolated ones or to

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a special sequence, thus avoiding any threat of a spoonfed stereotyped taste, and encouraging an understanding of the qualities that are basic and perennial. None would suggest that the subtler shades of aesthetic experience can be imparted in this way; but some attempt must now be made to base appreciation, as an important aspect of visual education, on something other than the revelation on which at present it relies.

But obviously the preliminary to these changes must be the completion of the winning out of exhibited material which progressive museums have already done. There are still too many museums, some in unexpected places, the sight of whose massed exhibits, inadequately labelled and co-ordinated, daunts even the expert. The functions of the museum as an educational centre and as a storehouse for research material must not be confused, especially in its exhibition galleries. The plea for an adequate museum service must in the end rely on its cultural and educational value to the community as a whole, rather than on the sectional needs of research workers and dilettanti.

It remains to add a footnote on museum buildings, not to discuss them in detail, but to suggest that now would be a highly appropriate time to set up a body to examine, in collaboration with expert architectural opinion, the architectural problems of the modern museum. The mere statement of such problems, pooling as it would the experience of the period in which the modern idea has developed, would be of inestimable value in the approaching phase of extended museum activity.

The modern museum is a new form, its aim and technique modified by the need of a wider public and by the growth of knowledge. Whatever the importance of its other facilities, its success as an instrument of visual education must be in its exhibition arrangements. In seeking to present 'things' to a wide range of people in conditions which will allow those things to make the greatest impact on the mind something more is needed than the light, air and cleanliness which are often accepted as satisfactory substitutes for the gloom and dust that for many people are synonymous with the word 'museum.' Stated at their simplest the visitors' needs are comfort and ease of seeing; the curator's (apart from ordinary efficiency), flexibility of plan and unobtrusiveness of architectural detail, fittings and colour, so as first to allow the growth and re-arrangement necessary in an organism that should keep pace with modern discovery; secondly to impose the minimum of restriction on the exhibition and arrangement of the specimens.

In museum buildings we have advanced to the extent that the use of old buildings for ordinary case-exhibition is no longer generally accepted as satisfactory. But in my opinion the first modern museum will not have been built in this country until a new formalism has been adopted suited to these new needs. Lighting problems in themselves will probably be solved only by a departure from present-day accepted methods.

If this sounds like a plea for the replacement of the so-called traditional styles usually employed in our public buildings, that in fact is what it is. I believe that we shall only acquire fully efficient museums when this question of function has been squarely faced and allowed its due weight. It is perhaps too much to hope for revolutionary changes from public authorities, which are notoriously conservative in these matters; but it will be something if from the beginning the importance of the need for the fullest collaboration between architect and curator is recognized. It must be the architect's task to produce an aesthetically satisfying solution for the curator's requirements; he must begin by thinking curatorially, aided by experienced and far-seeing museum workers; or the result can only be additional problems for the curator to solve. This is an obvious truth. But contemplation of existing museum architecture suggests that it will bear frequent repetition.

Notes and News

MULTIPLE RAMPARTS: A NOTE IN REPLY

On a momentary return to England I see that Mr Colin Gresham has been writing on multiple ramparts in *ANTIQUITY* (June 1943, No. 66, pp. 67 ff.) and that Mr B. H. St. J. O'Neil has likewise touched on the subject in *Archaeologia Cambrensis* (1942, xcvi, pp. 16-17). At the end of his article Mr Gresham reaffirms an important difficulty of Mr O'Neil's in regard to the date 56 B.C., tentatively suggested by me for the Iron Age re-building of Maiden Castle in its first multivallate form. 'This date he [Mr O'Neil] points out does not leave sufficient time for the "Hill-fort B culture" to move northwards and pass through the various periods noted at Ffridd Faldwyn Camp near Montgomery'. On turning to Mr O'Neil's extremely interesting and valuable report on Ffridd Faldwyn I find the statement:—

'He [Dr Wheeler] states his preference for the date 56 B.C. to mark the approximate beginning of the construction of large multivallate camps, such as Maiden Castle, Dorset, and is apparently unwilling to admit the possibility that the date can have been earlier than that by more than a decade or two.

The implications of this theory elsewhere than at Maiden Castle and its immediate surroundings are not touched upon by Dr Wheeler. If, however, the multivallate camps of the Marches derive their origin from a part of his Wessex, it must follow by this dating that they were all constructed between some date after 56 B.C. and the time of the Roman conquest at dates varying from A.D. 50 to A.D. 75. Some time must be allowed for the spread of the new weapon and its counterpart northwards, and account must also be taken of the size of some of the earthworks and of the time and numbers of men required to erect them. As already stated, Ffridd Faldwyn has three pre-Roman structural periods of the multivallate camp, and at Old Oswestry there are at least three structural periods, which belong to the same time. If, therefore, the implications of Dr Wheeler's dating are as has been stated above, and this conclusion seems at present inescapable, the evidence from excavations in Wales and the Marches must cause it to be considerably modified, since it does not allow sufficient time for the developments elsewhere, which are known to have taken place. An earlier initial date than 56 B.C. for multivallate camps in England is essential'.

Now let us get this matter straight and so avoid wasteful misunderstanding in the future. Mr O'Neil has unwittingly ascribed to me views which I have never held. I have never thought, said or written that all varieties and phases of the so-called 'Hill-fort B culture' were introduced into this country in or about 56 B.C.; nor have I for a moment suspected that 'the multivallate camps of the Marches derive their origin from a part of Wessex'. Mr O'Neil will fully appreciate this if he will glance at the summary of my views in my recent substantive Research Committee Report on Maiden Castle. This Report was not published until the end of 1943 and both Mr Gresham and Mr O'Neil therefore anticipated its appearance. But my statements on pp. 381-7 and elsewhere in that Report were written sometime between 1937 and 1939 and were incorporated, in substance, in at least one of my annual addresses to the Society of Antiquaries in that period.

Without enlarging again on details, let me repeat the main stages of my argument :—

1. Cross-channel trading by the Veneti of Brittany in pre-Caesian times is explicitly recorded.
2. There is identity (tested by excavation) between multivallate earthworks in the Breton and the Cornish peninsulas. Such earthworks do not occur elsewhere in northern France.
3. In Cornwall these earthworks are related to the distribution of tin, and are reasonably associated with the Venetic cross-channel trade. If so they must in origin be of earlier date than the drastic Caesian conquest of Brittany in 56 B.C. They may go back to the second century B.C. or earlier, but we do not yet know when they were first built.
4. In the small corpus of evidence at present available, there are suggestive hints of a connexion between Cornwall and multivallate earthworks in the lower Severn region and the Cotswolds. The local Iron Age B of the Severn-Malvern-Cotswold hill-fort area is marked by the use of currency-bars, which are apparently mentioned by Caesar. It is to be inferred therefore that this local phase of Iron Age B is also in origin pre-Caesian—again, how much pre-Caesian we do not know, but we may, if we like, postulate ample time for the spread of certain features thence to Montgomery and further afield.
5. Dorset, etc., was notably isolated culturally until the end of the Iron Age. (This point is discussed in my Report). 'Wessex' was practically devoid of tangible exports and imports at this period; its economy was based upon agriculture and distinctively local industries. Within these limitations the population prospered and was already, during Iron Age A, to some extent nucleated in extensive earthworks. Only at one moment prior to the Belgic period do we find the clear impact of new and foreign ideas; manifested suddenly by the drastic revolution of military methods of attack and defence, and more gradually by the introduction of new types of domestic equipment. The military innovations are generally similar to those which we have already seen in Brittany, Cornwall and the Severn region; but their scale is somewhat exceptional and may be ascribed, first, to the magnitude of the existing defences on which they were superimposed, and, secondly, to the high initiative and authority of the new command. The economic isolation of the region makes it clear that the new rulers did not come as traders; the immediate but gradual penetration of associated innovations—notably, the metallic bead-rims and the Breton countersunk handles of the pottery—indicates a minority intrusion with few craftsmen: and at the same time the nature of those innovations, almost unparalleled elsewhere in Britain, precludes the supposition that we are here dealing merely with a culture-spread from Cornwall or the Cotswolds. A variety of general considerations combine to suggest the ascription of the episode (the beginning of 'Maiden Castle B') to the middle of the first century B.C. At that period, the picture of a powerful minority, coming as settlers and rulers but not as traders, with foreign (Breton) rather than British contacts, controlling and influencing, but not replacing the native population, tallies remarkably with the sort of situation which is likely to have been created by Caesar in 56 B.C. in his systematic purge of the powerful tribesmen of Brittany. I suggest the association of ideas, but I have no desire to over-emphasize it and my general dating does not hang on it.

It will be seen that, so far from claiming any sort of chronological priority for Maiden Castle in the matter of multiple ramparts in Britain, I have placed it at the bottom of my short list. Thus in his footnote in *Arch. Camb.* as cited, p. 17, Mr O'Neil commends me for showing (in *Antiquaries Journal*, xxii, 1942, 266-7) 'a welcome appreciation' of the difficulties of a view which I have in fact never held.

Finally, let me make it clear that, whilst the infallibility of the factual evidence from Maiden Castle is an article of my creed, I should be the last to maintain the impeccability of the provisional deductions, whether mine or anybody else's. After much thought, they seem to me, as stated in my Report, to form a logical explanation of the evidence as it stands, but I have no doubt that, when I return to England in five years' time, archaeologists will have garnered a mass of new corrective (or even confirmatory) evidence. I may perhaps be permitted to wish their labours every success, and only ask now that their efforts be directed to real rather than to supposititious difficulties.

R. E. M. WHEELER.

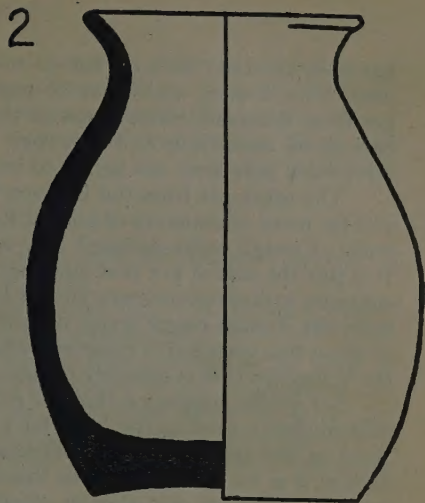
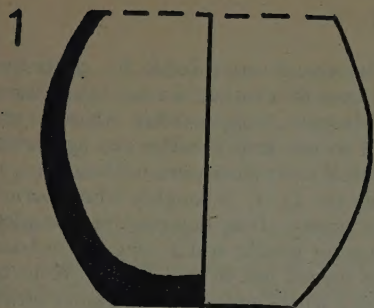
WINGHAM VILLA AND ROMANO-SAXON POTTERY IN KENT

Mr A. G. Wells has done right to call attention (*ANTIQUITY*, 1943, xvii, 210-2) to the evidence provided by George Dowker's account of the 1881 excavations for the post-Roman occupation of the villa at Wingham, Kent. As a supplement to his note it may be worth recording that there is at least one object preserved from these excavations which can be used to illustrate Dowker's reference to the 'coarse black pottery, apparently belonging to culinary vessels' which he regarded as one indication that the 'site was occupied by a semi-barbarous people'. This is a fragmentary vessel in the Maidstone Museum of which a section is shown (p. 53, 3). It bears a label which reads, 'Thick urn from Wingham Villa: Saxon'? It is an undecorated hand-made jar of rough, hard, gritty, ware, brownish grey in colour, and with a smoothed surface which may once have been burnished. The whole of the rim is unfortunately missing. The base is fairly flat but markedly asymmetrical, the section being considerably thicker on one side than the other. It is ornamented on the outside with a roughly wiped cross, a feature which can be paralleled both in Roman and in pagan Saxon pottery.

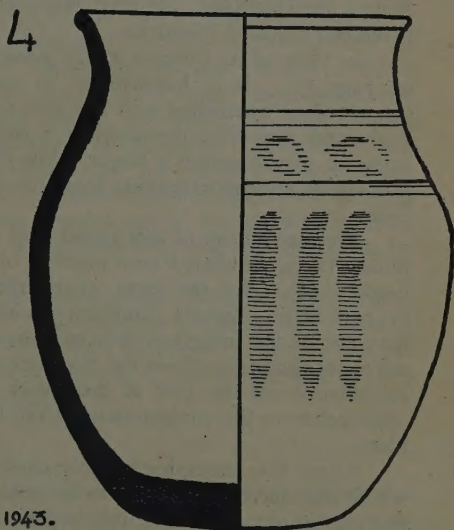
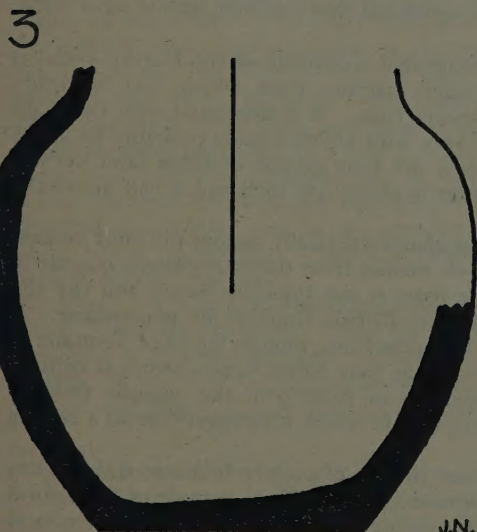
Whether this vessel can be properly described as Saxon, I am not prepared to say. Neither the form nor the fabric is sufficiently distinctive to make the attribution certain. It is, however, a very queer pot to find in a Roman villa. The suggestion on the label may mean little more than that the excavators correctly recognized it as being quite out of place among their Romano-British potsherds. If they had only recorded the exact position in which it was found in relation to the other supposed indications of post-Roman occupation we should be better able to assess its significance. As it is we must wait until the adoption of Mr Wells' suggestion that the villa should be re-excavated before we can hope for an explanation of the presence of such a vessel in a Romano-British building.

It may also be relevant to note that among the pottery in the Maidstone Museum from the nearby Romano-British cemetery on Dearson Farm, Preston-next-Wingham (1), are two other vessels which seem out of place in a Romano-British context. These are shown (p. 53, 1, 2). The first is a small hand-made vessel in rough grey ware of the same general form as that from the Wingham villa; its base is, however, more rounded, and sags slightly, a common feature in Saxon pottery. Like the Wingham villa pot, it has lost the whole of its rim, but this evidently occurred in ancient times, for the neck

¹ Described by George Dowker in *Archaeologia Cantiana*, 1878, xii, 47-8.



INCHES.



J.N.L.M. 1943.

POTTERY FROM ROMAN SITES IN KENT, NOW IN MAIDSTONE MUSEUM

1, 2: from Roman Cemetery, Dearson Farm, Preston-next-Wingham. 3: from Roman Villa, Wingham.
4: from Roman Villa, Hartlip

By permission of the Curator of the Maidstone Museum

has been carefully filed off flat all round so that the vessel was suitable for continued use. This feature, which can be paralleled in the case of a rather similar little Saxon pot from Banstead, Surrey, now in the Guildford Museum, suggests that, whatever the date of its manufacture, it may well have survived in use into a barbarous age when serviceable pots were not lightly to be discarded even if their rims were broken.

The other pot from the Dearson Farm cemetery (p. 53, 2) is roughly wheel-turned and far more reminiscent of normal Romano-British types. It is, however, very crudely made of rough corky-surfaced grey ware with a sagging profile and a very heavy base. It is just the sort of pot that one might expect to be turned out in sub-Roman Kent by someone with a rudimentary knowledge of the potter's wheel and an acquaintance either with late Roman coarse wares or with Jutish bottle-vases or with both. The presence of these two vessels in a cemetery which may well have been used by the inhabitants of the Wingham villa is certainly of some interest.

Mr Wells' suggestion that the evidence of post-Roman occupation in the Wingham villa might be used as the basis for a distinction between the history of East and West Kent in the period of Jutish settlement has not in my view much to recommend it. Indeed it is not the case, as his theory would require, that the villas of West Kent are entirely barren of post-Roman objects. As I have pointed out elsewhere (2), one of the very few undoubted Anglo-Saxon objects to have been found in a Roman villa in this country is a little pot in the Maidstone Museum from the Hartlip villa near Sittingbourne. There is nothing in C. Roach-Smith's account of the excavations at Hartlip (3) to suggest that he or anyone else suspected post-Roman occupation of this site, nor apparently did they notice the peculiarity of the pot in question occurring in Romano-British surroundings. It may, however, be significant that the villa, unlike most villas, produced coins to Honorius.

In view of its interest in the present connexion a drawing of the Hartlip vessel is on page 53. It is hand-made, in very rough leathery ware which was originally smoothed or burnished and has a heavy sagging base. It is decorated with two light horizontal neck-lines demarcating a zone of very faint hollows made probably by slight pressure of the potter's finger. On the body are four groups of three faint vertical grooves or flutings extending from the shoulder to about one inch and a half above the base.

The decoration of this vessel is of course characteristically Saxon, the faint vertical fluting being paralleled on a number of vessels mainly from the southeastern quarter of England (4). But the form, apart from the base, is not typically Saxon and the rim in particular suggests familiarity with Romano-British fashions in pot-making. It may not be too imaginative to suggest that this vessel too, though far more Teutonic in character than those from the two sites at Wingham, may reflect some attempt at cultural assimilation on the part of the Jutish conquerors of Kent with the ceramic fashions appropriate to the environment of the Roman villa in which it strangely found a resting place.

These few examples by no means exhaust the list of pottery found in this country which may have some claim to be called Romano-Saxon. There is more of this hybrid material in our Museums than is generally appreciated, and Kent is not the only part of England from which it comes. Nor is it only to be found in Romano-British cemeteries

² *Roman Britain and the English Settlements*, 2nd edition, 1937, 441 n.

³ *Collectanea Antiqua*, 1852, II, 1-24.

⁴ See *Antiquaries Journal*, 1937, XVII, 424-37, especially 432 onwards

and villas. Besides those mentioned above I have noted examples from several Saxon cemeteries, from a Romano-British town, a Romano-British village, and a Saxon Shore fort. It is a subject which will repay careful investigation when the contents of our Museums are again fully available for study and when there is once more leisure and opportunity for archaeological work.

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NEW DISCOVERY IN CHINA

The following account is reprinted (by permission) from the *American Journal of Archaeology*, XLVII, no. 3 (July-September 1943), p. 265 :—

Chinese workmen who were digging to make an air-raid shelter in Chengtu, Szechwan Province, have been responsible for an important archaeological discovery. Their picks struck a mound of brick and stone work which has been revealed as the grave of Wang Chien, distinguished official and self-appointed Emperor of the 10th century A.D. Chinese and American archaeologists believe that the contents of the coffin, as yet not fully investigated, will prove of great value to archaeologists and historians alike. Facts of this discovery have just reached United China Relief from the Associated Boards for Christian Colleges in China.

Wang Chien's grave was found a quarter of a mile outside the West Gate of the City of Chengtu in an historical mound believed, until now, to owe its fame to association with the Chinese poet, Ssu-ma Hsiang-ju, who died in 117 B.C.

Excavations of the tomb are now going on under the supervision of Dr Feng Han-I, Harvard-trained Director of the Museum of West China Union University. After clearing away the bricks and stones, the tomb chamber was found lying in a mud casing 15 feet thick. The tomb itself is 80 feet long, 20 feet wide and 20 feet high. At the back of the tomb-chamber, on the tomb-throne, was a statue—presumably of the dead man—and lying in front of this was a case, the dragon-shaped handles of which gave the first clue to the regal identity of the occupant. Two other cases, lined with silver and inlaid with silver and gold in discoidal design, contained two sets of jade books, composed of 53 leaves, 1 foot 2 inches long by half an inch thick. The inscription shows this to be a long commentary on the 'gracious reign' of Emperor Wang Chien. A detailed report of all the grave-furniture, including photographs and sketches, is being prepared by students and faculty members of the Department of Archaeology of West China Union University. The Emperor's coffin is expected to give a wealth of lacquer, pottery, copper and jade.

Wang Chien, who was born about A.D. 847, rose from the generalship to the governorship of Szechwan Province. When the house of T'ang collapsed in A.D. 906, he declared Szechwan to be a new kingdom, and proclaimed himself its Emperor. Chengtu was his capital. It was a city of wealth and culture, and is considered by some historians to have been, at that time, the most civilized city in the world.

THE LIVING PAST

It is, of course, a truism to say that exponents of the Past should bring it before the eyes of their audience and make it live. The implication—that the audience has no imagination—is only too often true. Whether the blind can be made to see without a miracle is very doubtful, but worth trying for the sake of the few. Visitors to the Museum of Fine Arts at Boston must have been somewhat shaken recently when they saw a life-size bust of an ancient Egyptian (Ankh-haf, of the 4th dynasty) dressed in modern clothes. Even hardened Egyptologists may have been momentarily taken

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aback by ' the modernity of the face, which might be met with any day on the street '.* The general public, pardonably confused by the ' Egyptian attitudes ' of conventional art, must have been sadly disillusioned by Mr Dows Dunham's bold experiment. If successful it might be worth repeating on a larger scale. It was an American who gave us delightful drawings of men of the old stone age in modern dress. One foresees great possibilities for this method of modernizing the heroes of the past—and also certain difficulties. Take Julius Caesar, for instance. As a military man he should be given a uniform, but exactly what sort of uniform? Some form of battledress would obviously be more appropriate for the Conqueror of Gaul than parade dress or mess-kit; but should he wear trousers or khaki shorts? A beret would seem a little out of keeping, but the cocked hat and feathers even more so. Plato must clearly wear a hood and gown; but hardly Socrates for whom (like Lenin) an old cap is indicated. For Attila some kind of zoo-suiting might be designed, or perhaps he could simply wear an old burberry. Henry VIII should have a loud check suit with a grey topper, and it would be a pardonable anachronism to put a race-card in his hand and a cigar in his mouth. His famous daughter presents a problem, whose solution may be left for the Director of Costumes; there are so few modern parallels to help.

The whole thing seems absurd of course, but it is not really more so than to dress up George III (of all people!) in a Roman toga; and until burnt recently the mid-nineteenth century busts of certain distinguished colonels thus garbed stood on shelves round the library of a Government department. If it was thought possible to make George III look like Julius Caesar, surely it is legitimate to reverse the process on the lines suggested by the Boston Experiment. We commend the idea to the Trustees of the British Museum for incorporation in their post-war reconstruction plan, but without any real expectation that they will adopt it.

* *American Journal of Archaeology*, 1943, XLVII, 334, summarizing Dows Dunham in Bulletin of the Museum of Fine Arts, Boston, 1943, XLI, 10 (2 figs.) The figure thus dressed was a cast.